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A READERS' DIGEST PUBLICATION

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Don't waste precious patio real estate. This compact, attractive stand holds your umbrella plus your favorite beverage. What more do you need?

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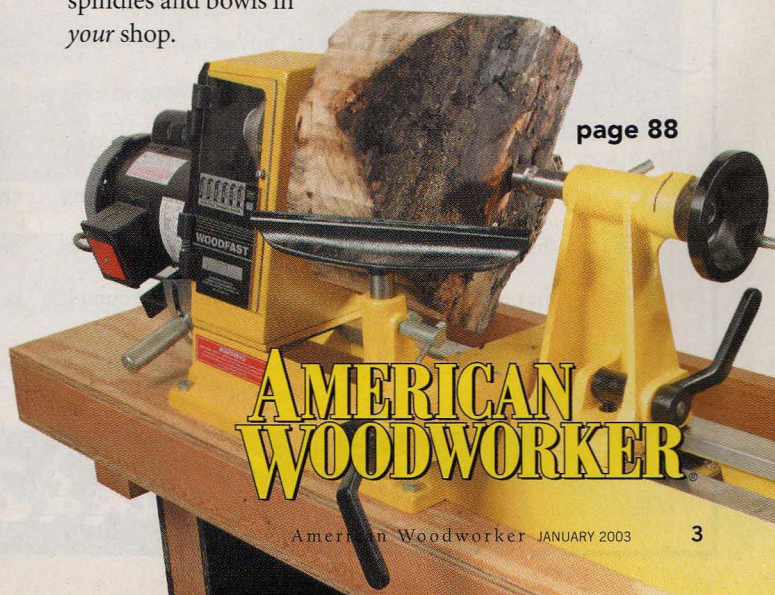


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TOOL TEST

Workshop Lathes **88**

They come smaller and they come bigger, but we tested 18 middle-of-the-pack lathes to see how well they would turn spindles and bowls in your shop.



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WOODWORKER**

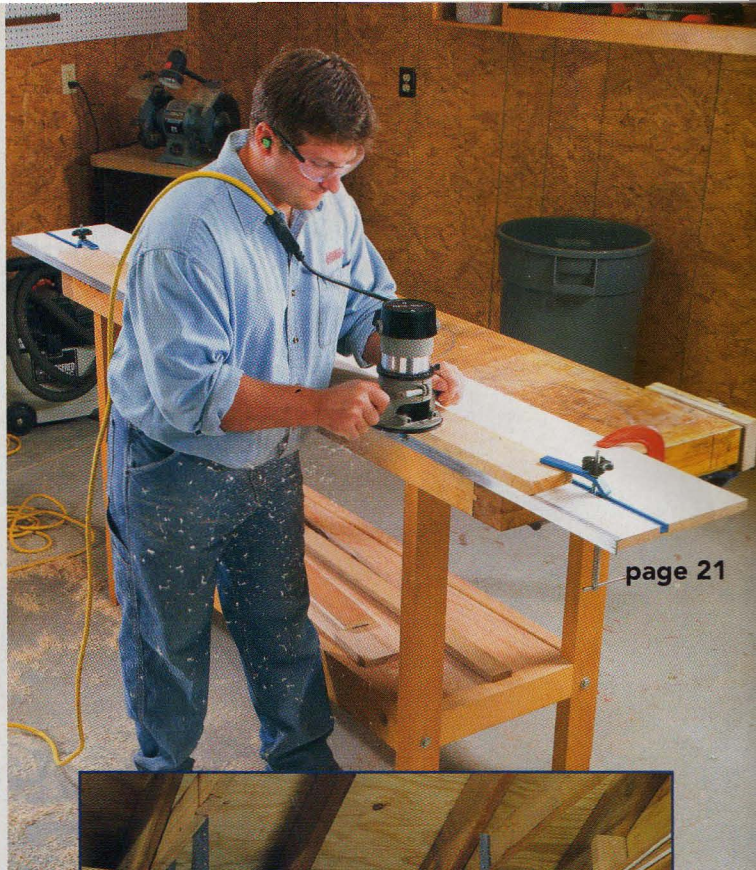
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American Woodworker Subscriber Service Dept., PO Box 8148, Red Oak, IA 51591-1148, (800) 666-3111
e-mail: AWWcustserv@cdfsulfillment.com

Copies of Past Articles: Photocopies are available for \$3 each. Write or call: American Woodworker Reprint Center, PO Box 83695, Stillwater, MN 55083-0695, (715) 246-4344, 8 AM to 5 PM CST, Mon. through Fri. Visa, MasterCard and Discover accepted.

Back Issues: Some are available for \$5 each. Order from the Reprint Center at the address above.

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Editor's Letter

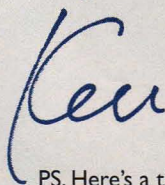
Forget the Cutting Diagrams

Every so often I get a letter asking why we don't publish cutting diagrams for solid wood, the way we do for plywood.

The answer is simply that lumber is so varied—in width, quality and grain pattern—that a cutting diagram can do more harm than good. Learning to work with the grain of wood, in its infinite variety, is one of the most important skills in woodworking. It's also one of its greatest joys. When it comes to solid wood, no cutting diagram can guide you; only your eye can see the parts you need in the boards you have.

For example, I recently needed six pieces of butter-nut, and had the wood been perfectly clear and straight-grained (ha!), perhaps I could have used a cutting diagram. Instead, my board (shown at left) had cracks, knots, swirly grain and two weird black veins. I had no choice but to cut around these defects. Cutting diagrams simply don't take this real-life woodworking into account.

Most important, though, is that there are few tasks in woodworking as satisfying as figuring out how to cut parts from a board. How to get the grain in each part so it's interesting, but not wild, so it matches well with the parts that will be next to it, so the grain patterns complement the shape of the finished piece and so the colors of the parts are similar. Sure, this takes more time and sometimes a return trip to the yard for more lumber. But nothing can make such a dramatic improvement to your projects as being particular about the grain. So go ahead, on your next project, toss away that cutting diagram and go for the best grain you can get!



PS. Here's a tip: Yellow and red chalkboard chalk are great for laying out parts on a rough board, because you can just rub the marks off if you change your plan.

AMERICAN WOODWORKER

Subscription Questions? See page 5

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PUBLISHED BY HOME SERVICE PUBLICATIONS, INC.,
a subsidiary of the Reader's Digest Association, Inc.

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Issue #98. American Woodworker®, ISSN 1074-9152,
USPS 738-710 Published bimonthly, except monthly September,
October and November by Home Service Publications, Inc., 260
Madison Avenue, 5th Floor, New York, NY 10016. Periodicals
postage paid at New York, NY and additional mailing offices. Post-
master: Send change of address notice to American Woodworker®,
PO Box 8148, Red Oak, IA 51591-1148. Subscription rates: U.S.
one-year, \$24.98. Single-copy, \$4.99. Canada one-year, \$29.98
(U.S. Funds).
GST # R122988611. Foreign surface one-year, \$29.98 (U.S.
Funds). U.S. newsstand distribution by Hearst Distribution Group,
New York, NY 10019. In Canada: Postage paid at Gateway, Missis-
sauga, Ontario; CPM# 1447866. Send returns and address changes
to American Woodworker®, PO Box 8148, Red Oak, IA, USA
51591-1148. Printed in USA. © 2003 Home Service Publications,
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Edited by **Tom Caspar**

Question & Answer

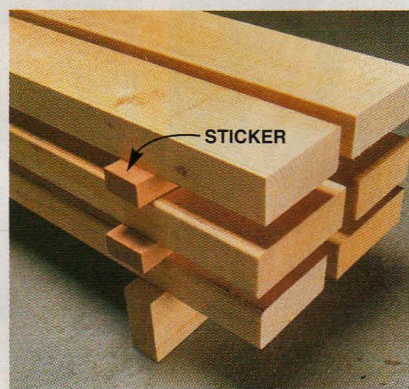
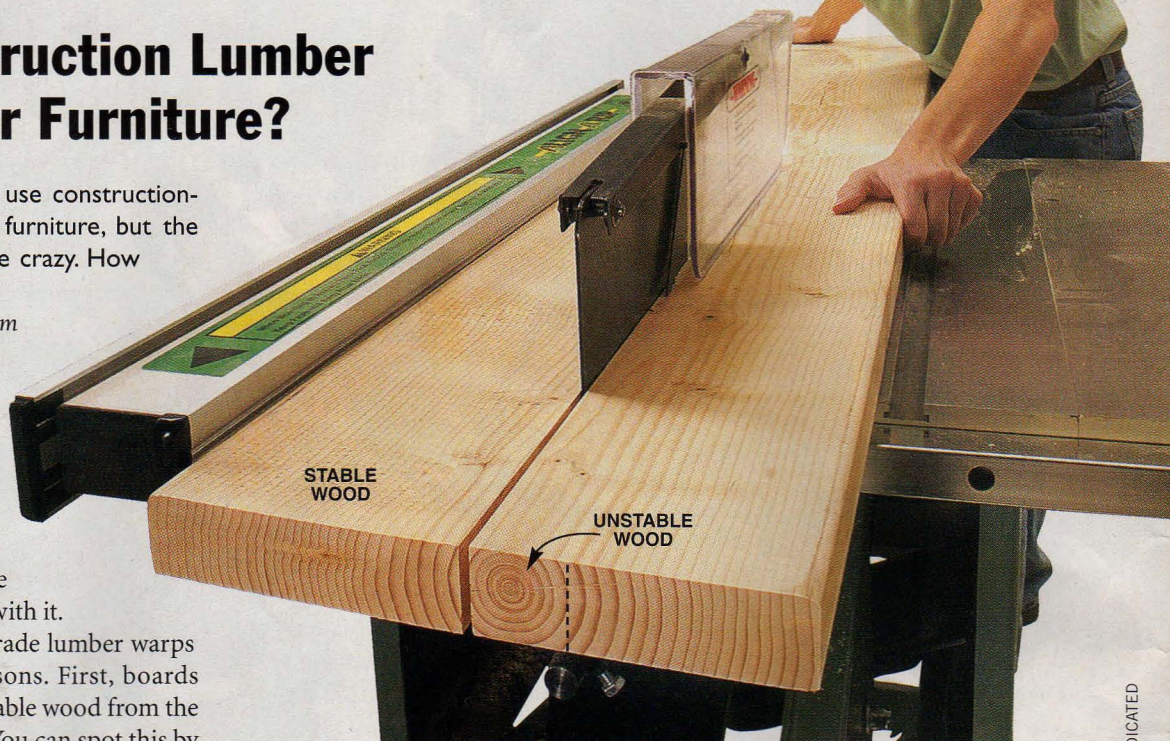
Is Construction Lumber Good For Furniture?

Q. I've tried to use construction-grade lumber for furniture, but the wood warped like crazy. How can I prevent that?

Harold Lindstrom

A. You can't use this wood as it is. You've got to do some selective cutting first and then dry out the wood before making furniture with it.

Construction-grade lumber warps for two main reasons. First, boards often contain unstable wood from the center of the tree. You can spot this by



Stack and sticker your wood to dry it out before using it for furniture.

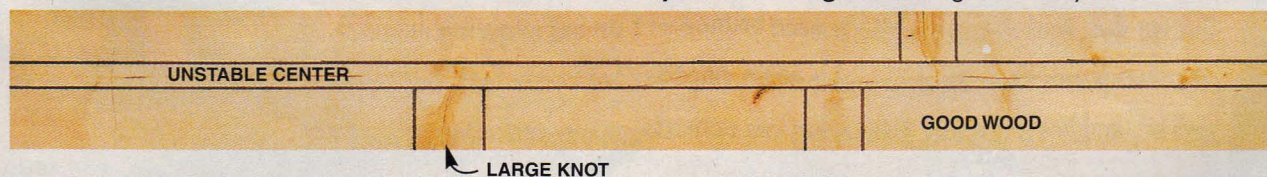
looking at the growth rings at the end of the board. If you see rings that are almost a full circle, that area of the board is likely to cup and twist.

Second, it's too wet. The industry standard for construction-grade lumber is about 19-percent moisture content. For making furniture, the moisture content should be far less, about 7 to 9 percent. At this point, boards are unlikely to warp any further.

Both problems are easy to solve. First, cut out the unstable center

wood by ripping your board on the tablesaw. Second, crosscut the boards on either side of large knots, which cause a board to kink as it dries. Don't worry about small knots. Third, stack and sticker the wood indoors until it dries out. Weight your lumber with cinder blocks or sandbags to help keep it flat. Drying may take anywhere from a few weeks in a very dry environment to a few months in a more humid one.

Buy wide and long boards to get the best yield of stable wood.



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Question & Answer

How Do I Keep Glued Boards From Slipping?

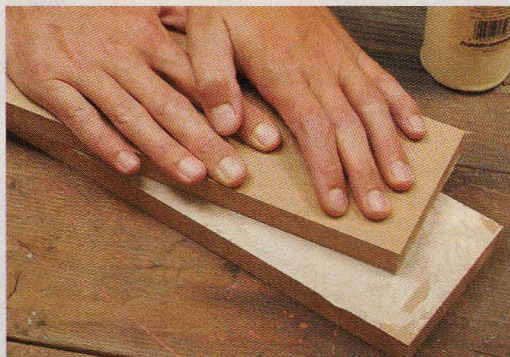
Q. Whenever I glue two boards face to face, they slip and slide out of alignment as soon as I clamp them. I suppose I could add a dozen clamps across their width and length, but isn't there an easier way?

Gordon Newinski

A. Yes. The trick is to apply just the right amount of glue and pressure.

First, use a squeeze bottle to make a long zigzag or spiral pattern of glue over the bottom piece. Then place the other piece of wood on top and rub the two together, pressing fairly hard. This spreads out the glue to cover the whole surface. Rubbing also squeezes out the excess glue so what remains absorbs into the wood and gets tacky faster. After a minute or so, the glue will begin to grip. Now slide the boards into alignment.

Put on your clamps, but only apply enough pressure to keep the clamps upright. Then tighten each clamp a little bit at a time, like putting lug nuts on a wheel. The glue tack and the gradual tightening will keep the pieces just where you want them.



First, rub boards together under pressure.



Next, tighten each clamp a little bit at a time.

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Question & Answer

How Should I Hold a Tap?

Q. I tried threading holes in metal for a woodworking jig, but I can't figure out how to hold the tap vertical. How do you do that?

Grant R. Selz, Sr.

A. Use the same tool you drilled a vertical pilot hole with: the drill press. The machine doesn't actually turn the tap, but it will hold it perfectly plumb.

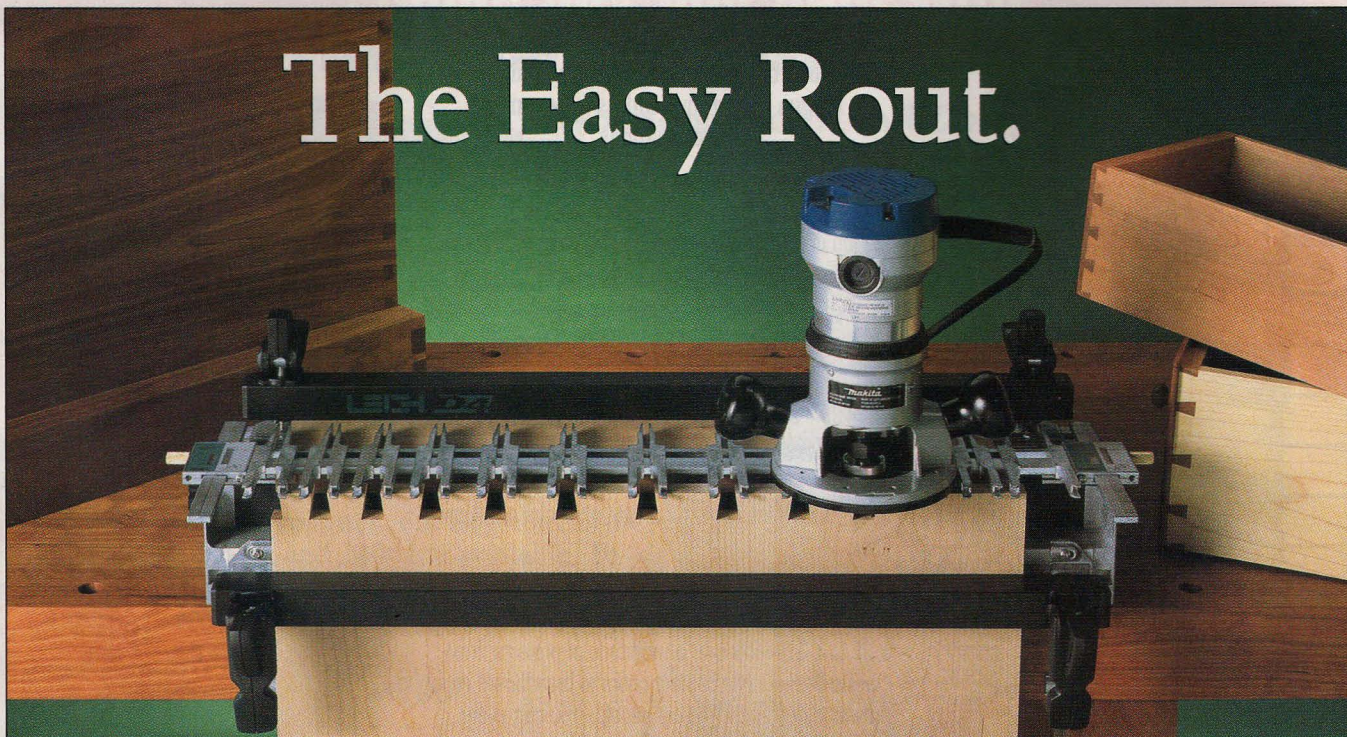
First, lightly chamfer the hole with a countersink. Leave the countersink in the chuck, but unplug your drill press. Tighten the tap in a T-handle tap wrench (see Sources, page 110). This kind of wrench has a hole or dimple on its top for just this operation. Lower the drill press table. Stand the tap in the pilot hole and lower the chuck until the countersink engages the hole in the top of the wrench. Lock the chuck in place and make sure the tap is vertical.

Lubricate the tap with oil. (Machinists use special cutting oil, but ordinary household oil works fine.) Turn the tap with one hand and apply downward pressure through the drill press with the other. After a few revolutions, or if turning becomes difficult, back the tap out one-half turn to break up metal chips. Then continue tapping until the tap spins freely in the hole.



Caution: Unplug your drill press for this operation.

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Better Drawer Sides

Q. I like using 1/2-in. birch plywood for drawer sides because it's so inexpensive, but when I rout dovetails sometimes it chips out like crazy. For a cleaner cut, should I be using solid wood instead?

Lorene Finnegan

A. No, you can stick with plywood, but switch to a different type, such as Baltic birch or ApplePly. Technique may not be the problem; it could be the material.

Most standard birch plywood has very thin face veneers glued to three thicker layers of softwood or utility hardwood veneers. These inner layers could contain rough areas, knots, voids and splits. When you hit those areas with a router, the result is chip-out.

Baltic birch and ApplePly are made from many more layers of thinner veneers. The inner veneers of both of these high-density plywoods

are very smooth, and the greater number of thin inner plies makes chip-out much less likely.

The top edges of your drawers will look better, too, because there are fewer and smaller voids in high-density plywood. You won't have nearly as many unsightly holes to fill.

Baltic birch is a generic term for imported plywood with birch faces and birch-core veneers. ApplePly is a trade name for one domestic manufacturer's plywood with maple faces and birch- or alder-core veneers.

Baltic birch is available at many lumber dealers in various thicknesses, but it only comes in 5-ft. by 5-ft. pieces (about \$25 for one sheet of 1/2 in.). One annoying problem: a whole sheet may not fit into the back of your truck or van without cutting first. ApplePly also comes in a variety of thicknesses and is made in standard 4x8 sheets (about \$60 for one sheet of 1/2 in.). See Sources, page 110, for how to find the ApplePly dealer nearest you.

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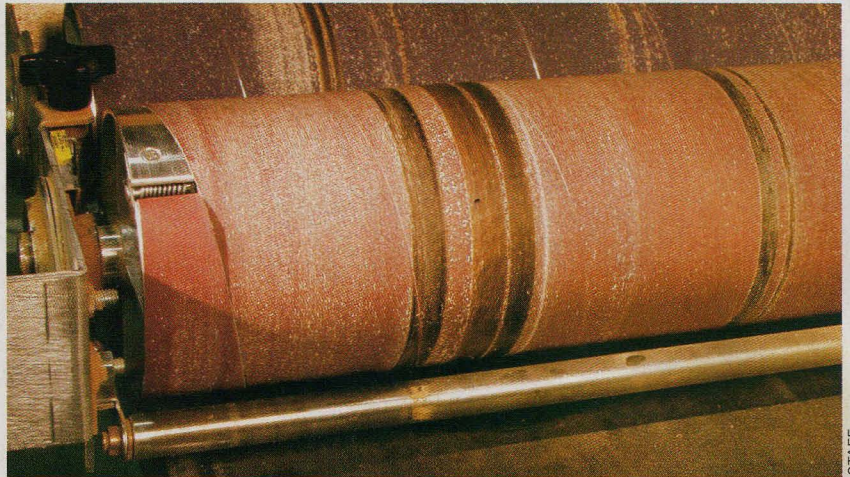
Drum Sander Woes

Q. My drum sander is a great machine, but I throw out way too much sandpaper with burned spots that scorch my wood. What am I doing wrong?

C. William Tewey

A. Don't feel bad. We've had a drum sander in the AW shop for four years and had the same problem, until we taped these reminders on our machine:

1. Always start with a coarse grit. Don't try to do it all with a fine grit.
Rough lumber - 36 grit
Planed lumber - 80 grit
Flattening glue-ups - 80 grit
2. Scrape off all dried glue before sanding. Glue lines scorch sandpaper!
3. Sand only the high spots on the first pass.
4. Angle your boards 10 degrees or so. The fibers are cut more cleanly, and glue lines are spread over a wider portion of the belt. Don't feed the wood straight on until the last pass.



STAFF

5. Rotate the crank one-eighth of a turn at most. Deeper cuts heat up the belt, causing it to wear out faster.
6. Run every board through twice before turning the crank. Make sure the current setting has removed all it can before cutting deeper. **AW**

If you have a question you'd like answered, send it to us at:

Question & Answer, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121 or e-mail to qanda@readersdigest.com. Sorry, but the volume of mail prevents us from answering each question individually.

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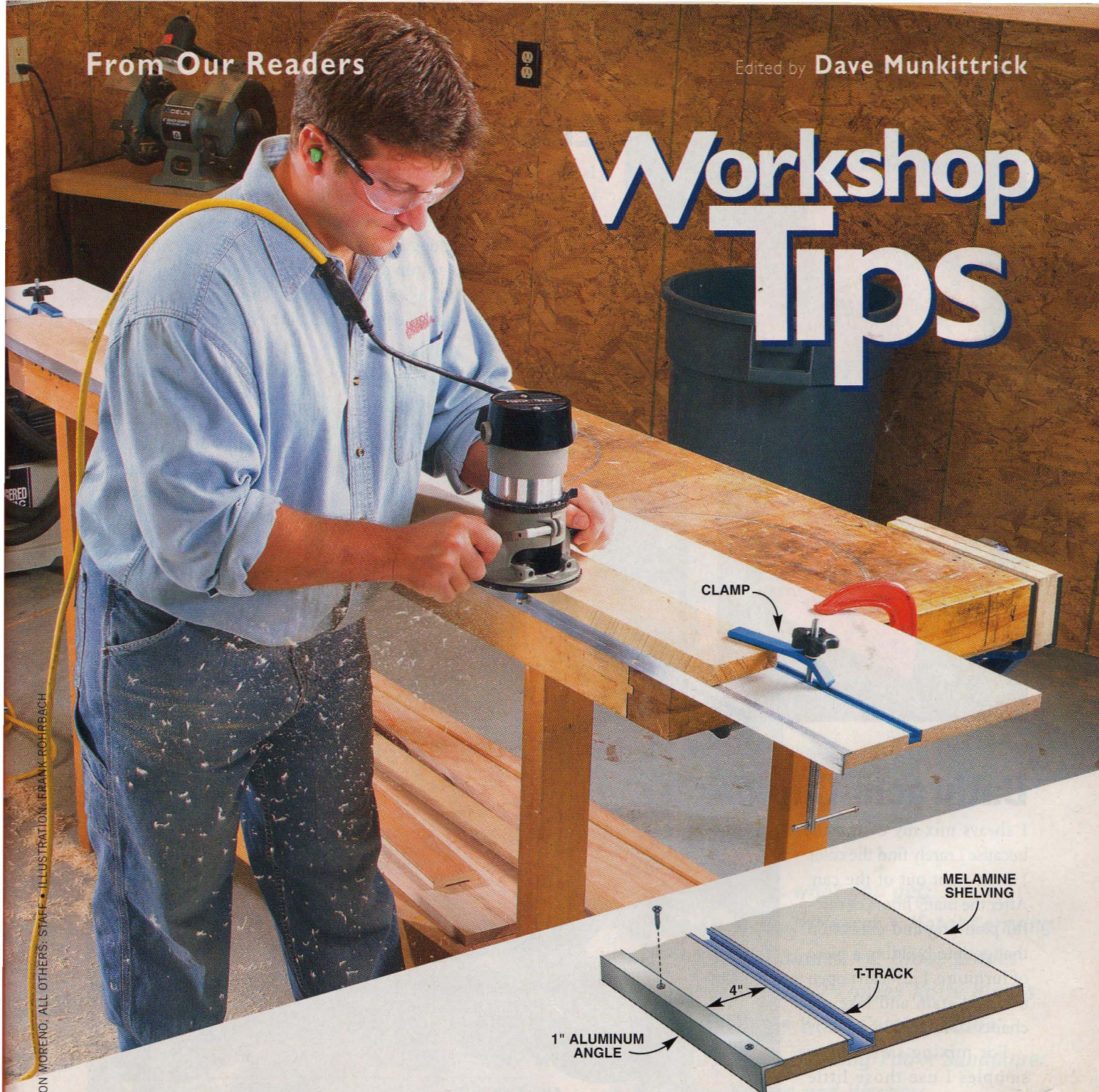
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Workshop Tips



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Straight Edges Without a Big Jointer

I can't edge joint boards longer than 4 ft. on my little jointer. I don't have the dough for a big jointer (yet!), so I had to figure out a way to edge joint those long boards. Here's what I came up with:

I bought an 8-ft. length of melamine-covered shelving from the home center. I ran a shallow rabbet along the top edge so an 8-ft. length of

1-in. aluminum angle would fit in flush with the surface of the shelf. I epoxied T-track into a dado that runs parallel to the aluminum edge. The T-track accepts clamps that hold the workpiece securely while allowing clearance for the router base. To use the jig, just clamp the board so the uneven edge just overhangs the aluminum angle. Then clean up the edge with

your router and a flush-trim bit.

Properly supported, this jig yields excellent straight edges on boards up to 8-ft. long. The jig also stores easily against a wall when not in use. It may not replace a full-size jointer, but for less than \$50, it's well worth the little bit of construction time.

Stephen Primatic

Sources See page 110

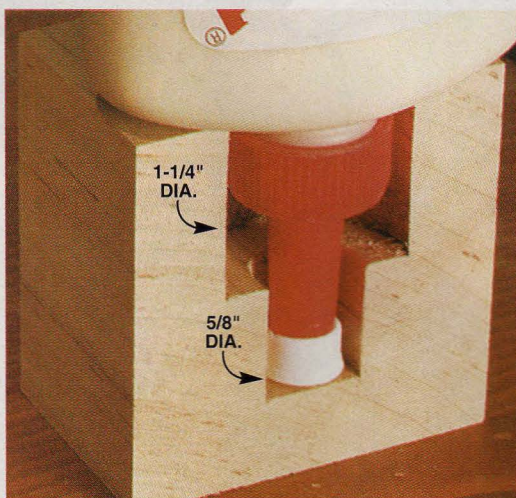


Eliminate Clogged Caps

Is your glue bottle half empty or half full? Either way, you're sure to become an optimist after trying this glue-bottle storage block. By storing the bottle upside down, you eliminate the half-dried glue that's forever plugging up the nozzle. Plus, there's no more waiting for the glue to run down the sides and into the tip.

Here's what to do: Take a block of wood about 3 in. x 3 in. and drill a 1-1/4-in.-dia. hole for the cap of the bottle followed by a

5/8-in.-dia. hole for the neck. Make the hole just deep enough to hold the cap onto the upside down glue bottle. Store the glue bottle in the block and your glue is ready to run right when you need it and because there's no air in the cap, there's never any crusty buildup to clean out.



Bruce Kieffer

Bathroom-Cup Mixers

I always mix my own stain because I rarely find the color I want right out of the can. After the many hours of careful planning and execution that go into building a piece of furniture, I just can't open a can of stain and take my chances with the finish.

For mixing small color samples I use those little 3-oz.-disposable plastic cups. The plastic cups work much better than paper cups, which can leak with some finishes. You can buy them at any grocery store. For a few bucks more you can even buy the dispenser, hang it on your shop wall and have them right at hand.

Jean Bartholome



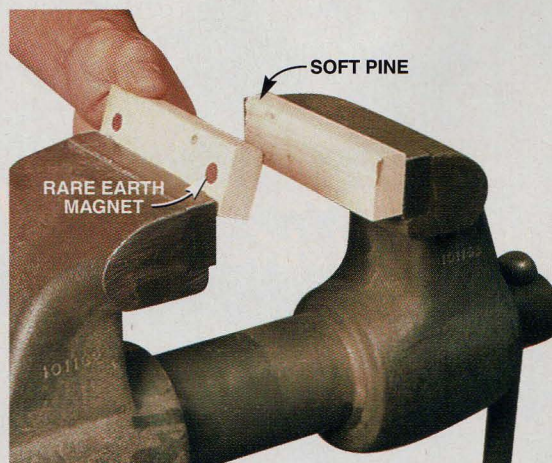


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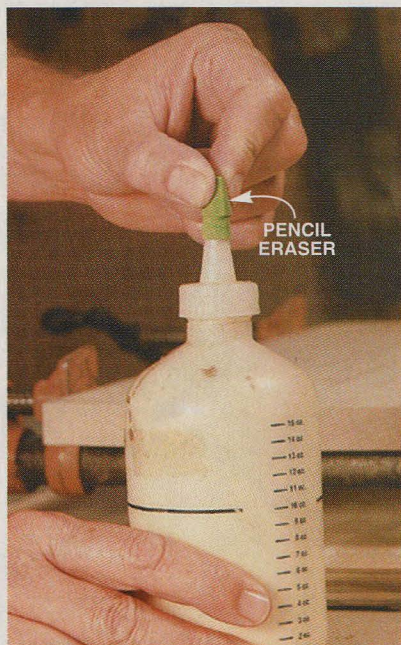


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Tom Caspar



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A Great Glue Bottle Tip

I like the narrow tip on refillable glue bottles. What I don't like is the tiny little cap, which is very easy to lose.

The other day I was pawing through shavings on the floor looking for my lost cap when the pencil in my apron pocket decided to join the bottle cap on the floor. That did nothing for my mood until I saw the solution to my lost-cap problem on the end of my pencil. It was the replacement eraser. It slipped right over the glue bottle like they were made for each other. Eureka! I was back on my feet and working at my bench instead of the floor.

Dave Munkittrick



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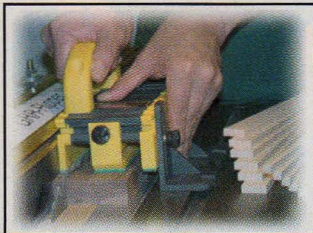


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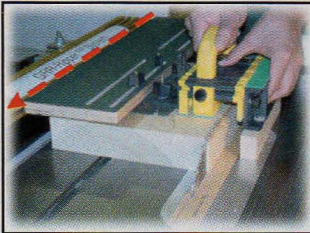
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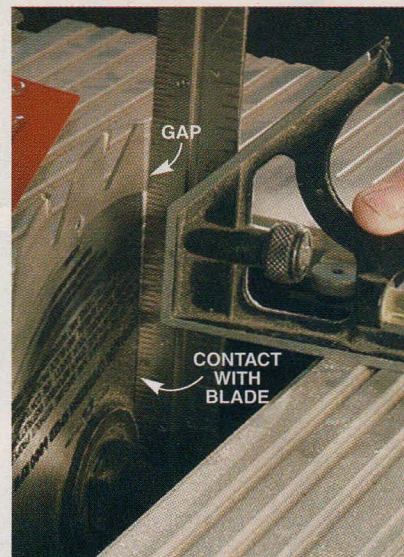
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Workshop Tips



Easy-to-See 90-Degree Blade Check

Most tablesaw cuts require the blade to be set perfectly at 90 degrees to the table. As a check, I used to crank the blade all the way up and set a square between the table and the protruding portion of the blade. I had a hard time discerning the tiny gap that might appear over the 3 in. of exposed blade.

Happily, I discovered a way to use the full diameter of the blade so what would be a tiny gap across 3 in. of blade, becomes a much larger gap across the full 10-in. dia. With the throat plate removed, I set a combination square down through the table so it bears against the entire surface of the blade. Even if the blade is off by only a fraction of a degree, it's easy to see.

Al McGregor

AW

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The Well-Equip

Planers With Built-In Dust Collection

We recently tested Craftsman's new 13-in. benchtop planer (model # 21743; \$440) with built-in dust collection. We were impressed; using only the planer's on-board dust-collection system, nearly every speck was collected.

A fabric dust shroud allows you to connect the planer to a 30-gallon trash can or bag that you provide. The shroud

also works as a filter. A fan in the planer's dust hood propels shavings directly into the can or bag and the dust shroud works as a filter.

Along with built-in dust collection, this planer has powered height adjustment, so you can quickly raise or lower the cutterhead. You make fine adjustments with the hand crank.

Like most benchtop planers these days, this machine has a lock lever on the cutterhead that effectively reduces snipe. Snipe was barely detectable on the boards we ran through this machine. This planer uses indexed double-edged knives, the easiest style of knife to change.

The Craftsman 21743 has features found on many other 13-in. benchtop planers, with the added benefit of a very useful built-in dust-control system. If you need a planer and don't have a dust collector, this machine is worth a look.

Another new Craftsman planer, the 12-in. #21722 (\$300), includes the dust collection system but not the powered height adjustment or cutterhead lock.

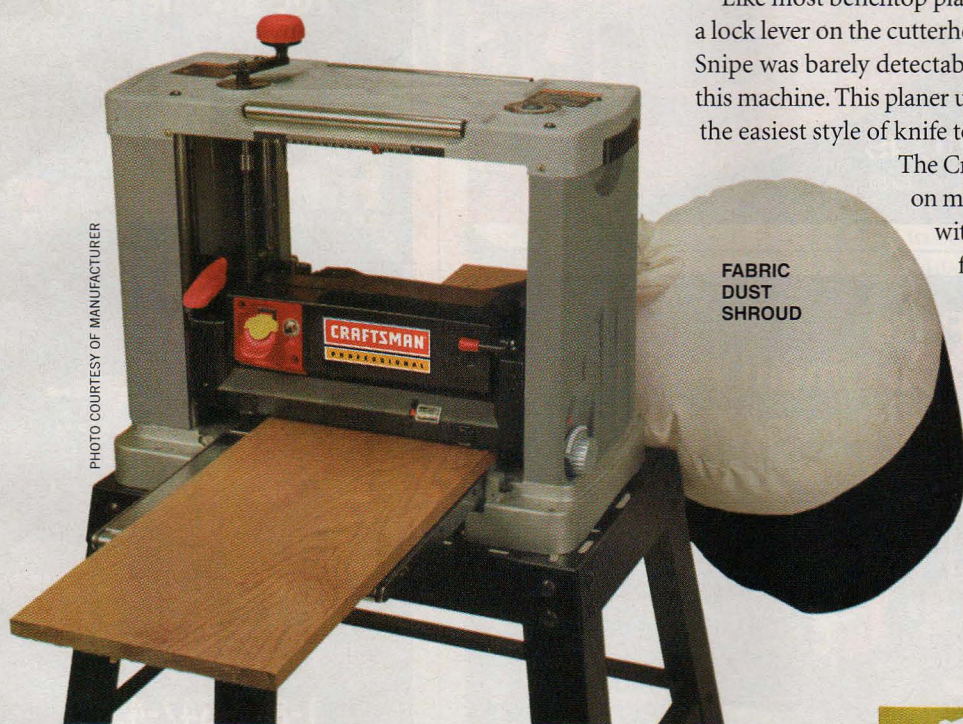


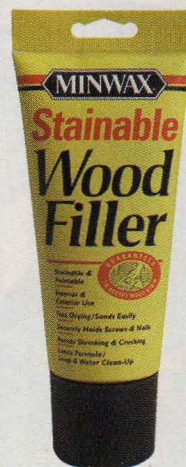
PHOTO COURTESY OF MANUFACTURER

Easy-to-Use Wood Filler

The problem with most wood fillers is the can they come in. If it's open for more than a minute or two the filler starts to get crusty. Minwax and ZAR have put the lid on this problem with their wood fillers that come in tubes.

We like 'em because the filler

squeezes out of the tube like toothpaste, making it easy to get just the right amount in just the right spot. These are both latex products, so unlike solvent-based fillers they're easy to clean up. That's a good deal, because c'mon, you know you're going to use your fingers to apply it.



PHOTOS COURTESY OF MANUFACTURERS

opped Shop

by Tim Johnson and
George Vondriska

Size-to-Fit Drill Handles

These drills fit all hands, large or small. Porter-Cable's new Grip-To-Fit cordless drill/drivers come with interchangeable grips. Remove one screw to change the grip from small to medium to large. That should make the drill more comfortable and easier to use, especially if your mitts are very large or very small.

The Grip-To-Fit system is available on three cordless drills; the 12 volt, \$160, 14.4 volt, \$200, and 19.2 volt, \$250. Each of these T-handle drills comes with two batteries, a one-hour charger, two speed ranges and a 22-position clutch.



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Fractions Made Easy

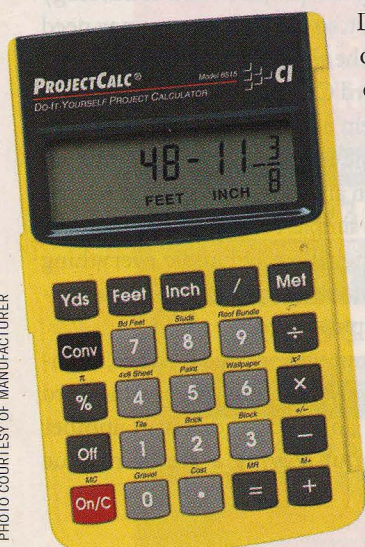


PHOTO COURTESY OF MANUFACTURER

Did I do the math right? Woodworking often calls for addition and subtraction of fractions. Fractional math can make your head spin and leave you with that nagging doubt. A fractional calculator is cheap insurance to make sure everything adds up.

The ProjectCalc from Calculated Industries (\$25) is specifically designed for the construction trade and do-it-yourselfers. This little genius is designed to do everything from fractional math to figuring board feet to calculating how many bundles of shingles are needed to cover a roof. Commonly used formulas, like

board feet, are stored in the calculator. Enter the dimension (thickness x width x length), then convert and you'll have the board-foot total. Not only does ProjectCalc handle fractions, it "thinks" in inches, yards and feet and can convert from one to the other.

You can also walk into almost any office supply store and for as little as \$8 you'll find calculators that handle fractions. If possible, use the calculator before you buy it. Make sure entering whole numbers and fractions is intuitive so you don't go nuts trying to master the calculator. Many of these calculators handle fractions, but they don't work in feet and inches. You'll also need to memorize the formulas for calculations like board feet.

Sources for all products

See page 110

The Toughest Glue On Planet Earth

Gorilla Brand Premium Glue is the all purpose, interior/exterior glue ideal for most repair and bonding needs. It's great for indoor/outdoor furniture repair, woodworking projects, as well as general repairs around the house. Bonds wood, stone, metal, ceramic and more! Incredibly strong and 100% waterproof.



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The Well-Equipped Shop



\$30 Screwdriver for Tight Spaces

It's easy to end up in tight spaces when you're driving screws. Drawer slides, for example, often end up in places where it's hard to fit a standard cordless drill. Right angle drills are great, but are typically pretty expensive for a tool you use once in a while.

Black & Decker's cordless two-position Pivot Driver (\$30) is a much less expensive way to get into small spaces. The driver head pivots to make it easier to get at those nooks and crannies. The driver works in forward and reverse, and can also be

locked. This is handy if you need to manually start or finish a screw.

This 3.6-volt driver isn't designed to handle big screws, but it's perfect for the small screws that come with drawer slides and other hardware components.

PHOTO COURTESY OF MANUFACTURER

Easy Cord Management



PHOTO COURTESY OF MANUFACTURER

Building an entertainment center, office cabinet or display case often means taming the spider web of wires that can end up entangling the project. And technology changes fast, so before long you may need to change the wiring configuration.

3M's Cord Clips with Command Adhesive can help untangle the mess. The clips are available in a variety of sizes and are easy to open and close, so adding or removing wires is simple. Priced from \$3 to \$4 per package, they'll easily handle everything from one or two telephone wires to a bundle of computer cords.

When your wiring needs change, Command Adhesive allows you to peel the Cord Clip loose and stick it down in another spot, without leaving a messy residue behind.

Sources for all products

See page 110

The Well-Equipped Shop

\$200 Variable-Speed Drill Press

Delta's new 12-in. ShopMaster benchtop drill press offers convenient speed control. No more finger-pinching belt changes; just move a lever. You don't even have to stop the machine. With Delta's DP350, you can choose any speed you want, and you can adjust the speed in tiny increments. Manual-change machines give you limited speed choices.

In a crowded workshop, a benchtop drill press doesn't eat up valuable floor space. A smaller table (8-1/2 in. x 10 in. on the DP350) is the most noticeable trade-off from a larger floor model. The DP350 has a 6-in. throat and a 3-1/4-in. quill stroke, enough capacity for most woodworking operations. It's equipped with a 1/2-in. chuck, an adjustable depth-stop mechanism, a 1/3-hp motor, a quill lock and a work light.

The \$200 DP350 costs about the same as other manual-speed-change benchtop machines. Floor-model drill presses start at about \$250.

Sources for all products

See page 110

34

American Woodworker JANUARY 2003

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Steel-Free Abrasive Wool

Steel wool is a workshop staple for removing old finishes and rubbing out new ones. But there's a problem. You can't use steel wool with water-borne finishes. Here's an answer: a new synthetic abrasive wool that's compatible with all finishes.

Fibral abrasive wool costs more than steel wool (a \$16 box contains about the same amount of abrasive wool as two to three \$3 sleeves of steel wool), but it's cleaner, easier on your hands, lasts longer and works just as well, if not better. It's great for scuffing water-borne finishes between coats, or for the final rub-out. Color-coded

fine, medium and coarse grits are available.

The abrasive is bonded to nylon fibers that are spun into a wool-like material. Tear off what you need, form a pad and have at it. It's flexible and conformable, just like steel wool, but it doesn't contain oil, and it doesn't shed nearly as much, so it won't make your hands dirty or contaminate the surface, like steel wool does.

Abrasive wool can also be used wet; its steel-free content means it won't cause rust. It's great for stripping furniture, because a wet pad won't disintegrate or leave rust-causing residue on the surface. I'll bet that once you try Fibral, you won't go back to steel wool.



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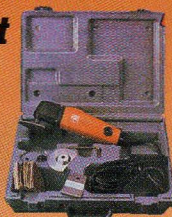
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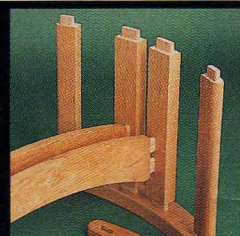
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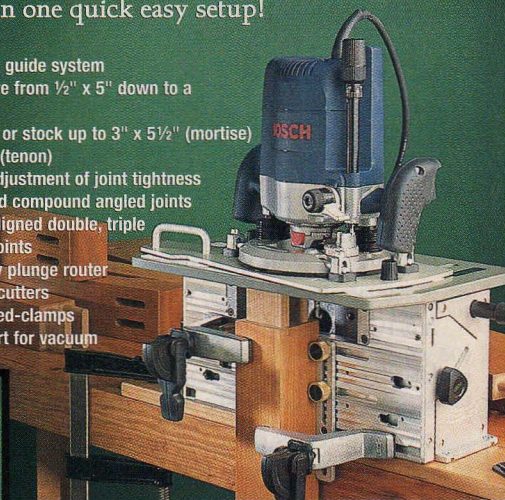
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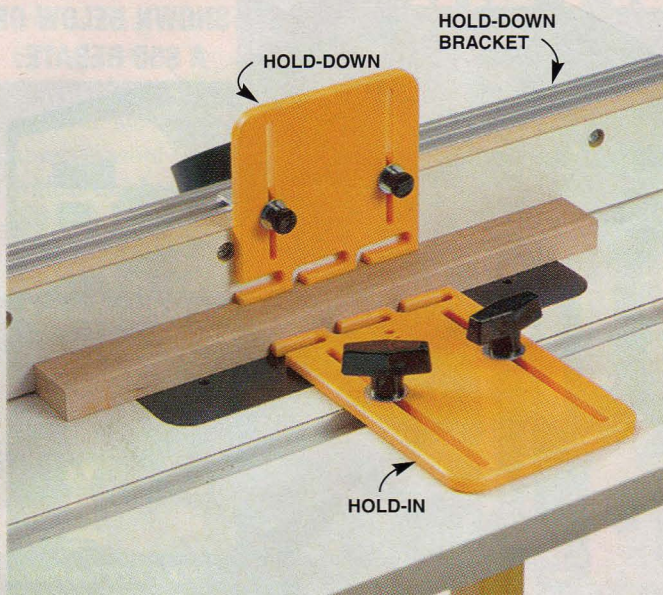


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New-Style Featherboards

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We're big fans of featherboards. They make router table and tablesaw work safer by providing pressure in places your fingers shouldn't go.

Woodhaven has introduced newly designed featherboards that they're calling Hold-Downs and Hold-Ins. Traditional-style featherboards (with numerous flexible fingers) are difficult to install, because they have to be pushed hard against the workpiece (but not too hard, or the workpiece won't slide). Only light pressure is required to position Hold-Downs and Hold-Ins so they'll guard against kickback and still let the workpiece slide. The secret is their slick plastic composition and the unique shape of their fingers.

The Hold-Downs mount to a bracket (it's supplied) that you fasten to your fence. The Miter Hold-In fits in any standard size (3/8 in. x 3/4 in.) table slot. The Universal Hold-In (not shown) clamps anywhere on your saw or router table, because it mounts on a wooden fence that you provide. Prices range from \$16 to \$43. A variety of combinations are available. **AW**

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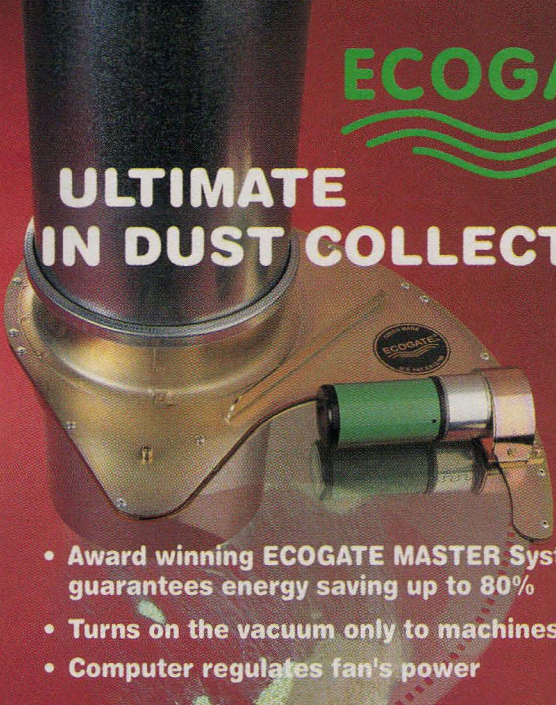
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Small Shop Tips

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TO LENGTH

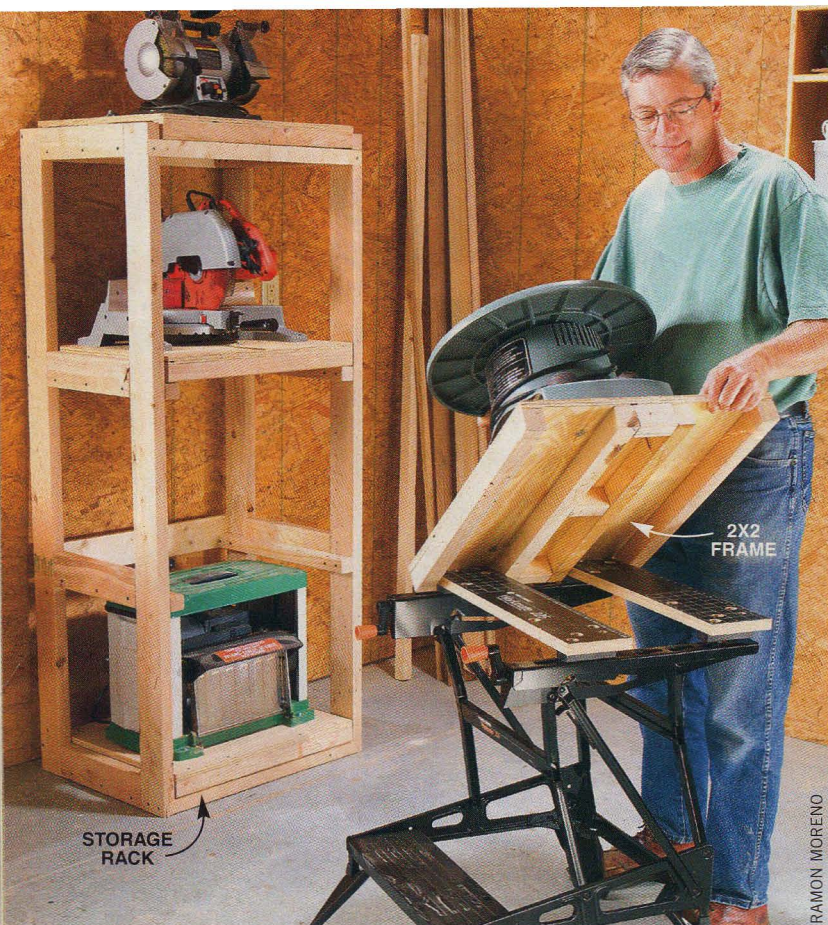
BUILT-IN LIP

Turn Your Storage World Upside Down

In my small garage shop, floor space goes for a premium while the air space overhead goes unused. I came up with a neat little trick to make use of that free space. All I did was bolt together a set of inexpensive metal shelves (about \$15 at a home center) and hung it upside down with lag bolts. (You may have to trim the shelf posts with a hacksaw to get the desired height.) The upside-down shelves have a built-in lip to prevent items from falling off. Keep the shelves up high so you won't bonk your head. Use your new-found floor space for stationary tools, a bench—you name it.

Kurt Pederson

ART DIRECTION: VERN JOHNSON AND DAVID FARR • PHOTOGRAPHY: BILL ZUEHLKE, UNLESS OTHERWISE INDICATED



Small Shop Tips

Benchtop Tool System

My shop is in a two-car garage, which (outrageously enough) I must share with two cars. That's why I use benchtop tools. Unfortunately, they're somewhat hard to store.

My solution is a two-part benchtop tool system that's as versatile as it is compact. The first part is a simple storage rack to keep all my tools off the floor. The second part is a Black & Decker Work-Mate that I bought at a home center. It serves as a sturdy workstation for each tool.

My benchtop tools are bolted to four plywood bases that slide into the rack. Nothing special so far. But the plywood bases have a center 2x2 frame that's slightly smaller than the maximum opening on my Work-Mate. Once I set the tool in place, a single turn of the clamping handles holds the tool securely. The resulting workstation is remarkably solid, doesn't "walk" across the floor, and can be quickly stowed away when I need the space for something else.

Jon Herron

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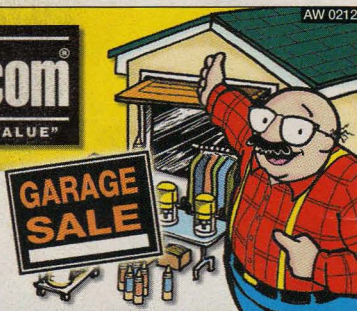
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Small Shop Tips

Space-Saving Clamp Rack

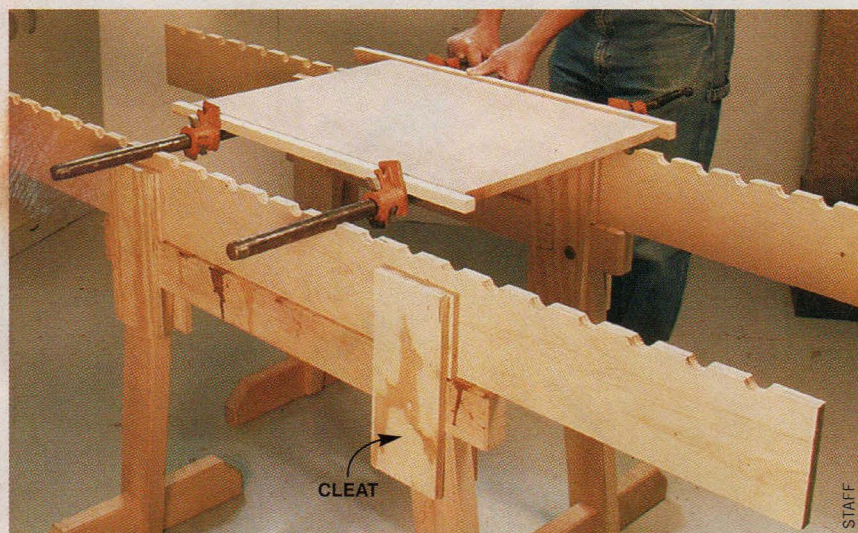
My bench is too small for big glue-ups. The only spot large enough is a little bit of open floor in my basement shop. I wasn't about to try glue-ups on the floor, so I had to get creative. My space-saving clamp rack was the answer.

I punched a series of 1-1/8-in. holes every 3 in. along the

centerline of a 12-in. x 8-ft. piece of plywood. Then I ripped the board down the middle, freeing up a pair of notched clamping racks. I nailed cleats to each rack so they would slip over my sawhorses and remain upright. The rack works for whatever length clamps I'm using and can support 8-ft.-long boards.

When the glue-up is over, the racks just pop off the sawhorses and store out of the way in the corner of my shop. Who needs a big shop anyway?

Randy Johnson
AW



If you have an original Small Shop Tip, send it to us with a sketch or photo. If we print it, you'll get \$100 plus an AW hat! Send to: **Small Shop Tips, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121 or e-mail to smallshoptips@readersdigest.com.** Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions, and use them in all print and electronic media.

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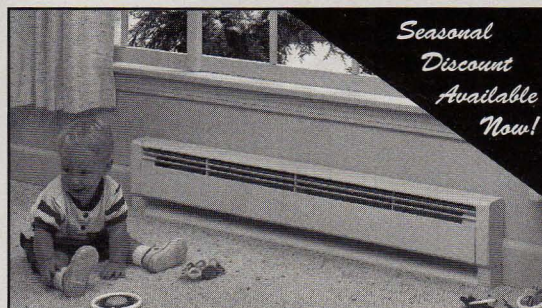
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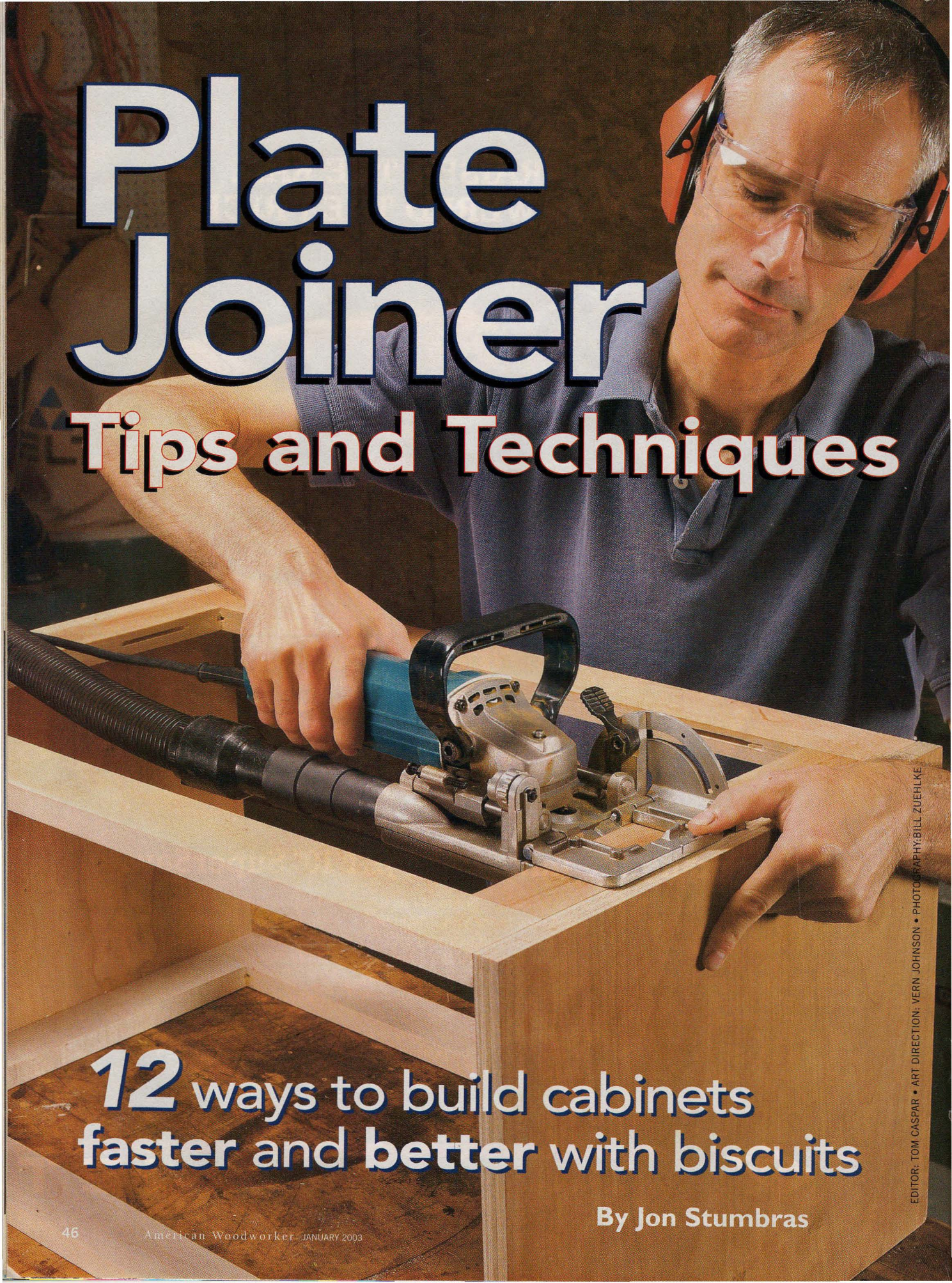
A man with grey hair, wearing safety glasses and orange earplugs, is focused on his work. He is using a blue and silver biscuit joiner to join two pieces of light-colored wood. The wood is part of a larger wooden structure, likely a cabinet. The background is a workshop setting with various tools and materials visible.

Plate Joiner

Tips and Techniques

12 ways to build cabinets
faster and better with biscuits

By Jon Stumbras

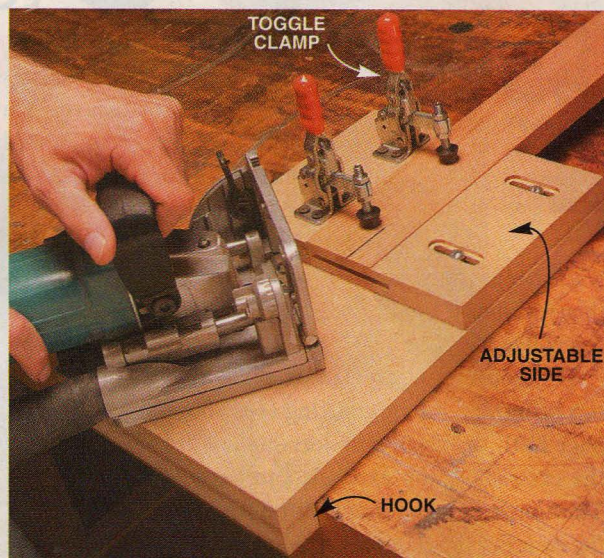


After you've put together a few face frames with dowels or pocket screws and discovered that the pieces don't line up, you may hear a faint inner voice. It will be saying "next time, use biscuits!"

Biscuits align parts far better than dowels or pocket screws, so it's easier to even up rails and stiles after gluing. Even small biscuits (the #0 size) offer enough holding power for any face frame that's glued to a cabinet. If a frame is narrower than a biscuit, don't worry. Simply let the slot and biscuit run out the inside corner.

Build a simple jig (right) to hold narrow pieces. Two toggle clamps (see Sources, page 110) secure the workpiece. After gluing the frame together, trim the excess biscuit with a router and flush-trim bit or a sharp chisel.

1 Fast, Accurate Face Frames



Hold narrow face-frame pieces with this adjustable jig. It adds extra bearing surface to the end of a rail so your plate joiner won't slip sideways.



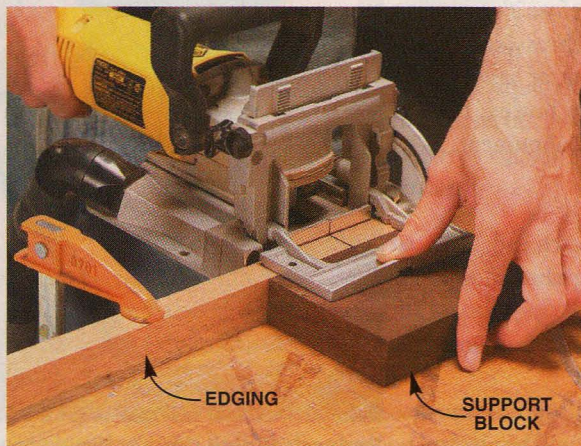
2 Align Solid Edging to Plywood

Have you ever sanded through a piece of plywood while trying to even up some solid edging that's too low? You can avoid this heartbreak by

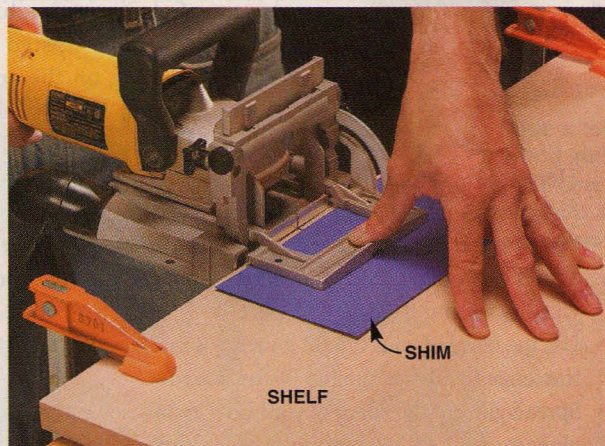
using biscuits to ensure that the entire length of edging is slightly higher than the plywood.

The whole idea is to make a slightly offset joint, with the edging raised up above the plywood by a very small amount, such as the thickness of a playing card. Biscuits are ideal for achieving this precise "misalignment."

To make this offset joint on 3/4-in.-thick edging, set your plate joiner to biscuit size #0. Cut slots in the edging (photo, below left). Next, cut slots in the plywood, but this time place a shim under the fence (photo, below). Any kind of thin shim will work, such as plastic laminate, a playing card or a couple of pieces of construction paper.



First, cut #0 size slots in the edging. Support the fence with a block that's the same thickness as the edging, so the fence doesn't tip.



Now cut slots in the plywood. Putting a shim under the fence produces an offset joint that's easy to level successfully.



3 Fasten Solid Wood to Plywood

A solid top is a great way to dress up a plywood case. But combining two different materials can be just asking for trouble. As you know, solid wood expands and contracts with changes in humidity. Plywood doesn't. If they're fastened rigidly to each other, the solid top will crack.

Tabletop mounting clamps allow a solid top to move without cracking (see Sources, page 110). They swivel in slots on the sides of the case as the top expands and contracts. They move in and out of slots on the back of the case. For the clamping action to work, the slot must be positioned so the clamps are compressed when you screw them in place.

How does your plate joiner fit in? It's the perfect tool to cut the slots for these fasteners. It's faster than setting up a router with a fence, and handier than using a router table. With a plate joiner, you can cut the slots *after* the

cabinet is assembled.

Setting the fence on your plate joiner correctly usually requires a couple of test cuts before you hit the right slot location. Adjust your plate joiner to make a #20-size slot.



Use your plate joiner to cut slots for tabletop mounting clamps.

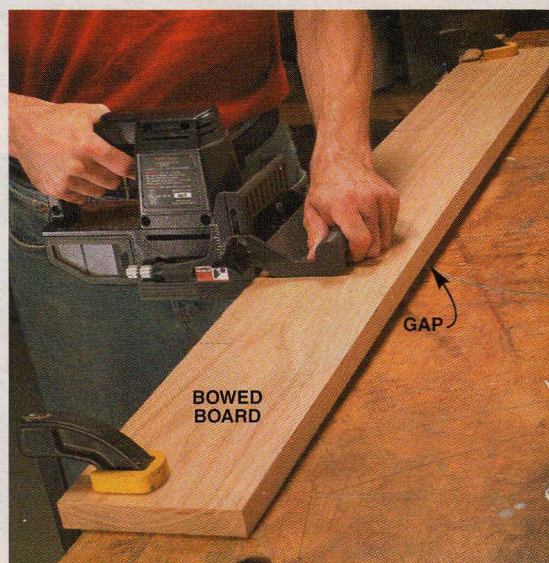
4 Align Long Edge Joints

Gluing up long boards can test the nerves of even the most seasoned woodworker. The goal is to get a perfectly flush top right out of the clamps, but all too often you end up with a top that needs a ton of planing or sanding before it's even.

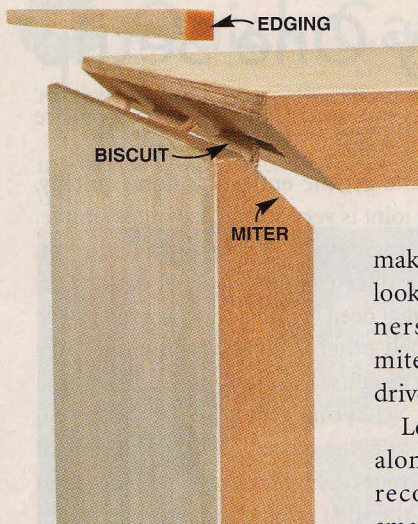
Biscuits make glue-ups go much easier and drastically cut down on the amount of sanding time. Many long boards are slightly bowed, but biscuits help bring bowed boards into alignment.

Here are some tips for cutting the slots:

- Select tight-fitting #20 biscuits.
- Position the centers of the outermost slots at least 3 in. from each end. This allows for you to trim 3/4 in. off after gluing without exposing a biscuit slot.
- Cut slots about 8- to 10-in. apart.
- Use the fence of your biscuit joiner, not the base, as the reference surface. Press the fence firmly on the top of the board.
- Spread glue on the edges of your boards, but not in the slots. This speeds your glue up. After all, the biscuits are for alignment only; the joint will be plenty strong without them.



Reduce sanding time by aligning bowed boards with biscuits. Reference your plate joiner fence from the top of each board.



5 Join Long Miters

Long miter joints look terrific. They make an all-plywood case look seamless at the corners. But getting long miters to look *right* can drive you nuts.

Let's be realistic; biscuits alone aren't enough. We recommend you add a small piece of hardwood edging to the outside corner as insurance. Here are two reasons to go to this extra trouble.

First, a tiny bit of slippage during glue-up is normal, and when you sand an ordinary mitered corner with tips that don't exactly line up, you're bound to sand through the face veneer on the piece that stands proud. This reveals some of the plywood's core, which is usually a different color.

Second, a sharp mitered edge is easily damaged, so it's best to round off the miter with a 1/8-in., or so, radius. You can't do that on ordinary plywood without going through the face veneer. The solution is to inset a thin strip of solid wood.

To make a long mitered joint, cut the miters on your tablesaw. The bevel should point up in order to minimize tear-out. Then fire up your plate joiner.

Reference from the Outside Edge

Adjust the fence on your plate joiner to wrap over the outside edge of the miter (Photo A). Set the height of the fence so the slot will be a little below the center of the miter. This prevents the biscuit slot from coming through to the outside surface. Insert the biscuits and glue the case together.

Rout the Corner

Add a fence to your router's base and install a 1/4-in.-straight bit. Adjust the bit and fence to cut a 1/8-in.-square rabbet (Photo B). Normally, you cut from left to right, but in this situation you should cut the opposite way, from right to left, to minimize tear-out of the thin face veneers.

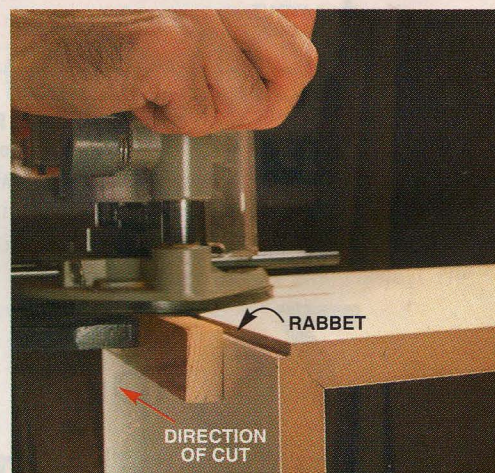
Add a Hardwood Strip

On a tablesaw, rip strips that are very slightly over 1/8-in. square. Apply glue to the rabbets and clamp the strips in place with masking tape (Photo C). Alternate the direction you pull the tape to draw the edging tight.

Scrape off the excess glue before it hardens and cut the edging to length. Sand it flush to the plywood and round the edge by hand or with a round-over bit.



A Cut accurate slots by angling your fence over the edge of a long miter.



B After gluing, rout a small rabbet on the corner of the cabinet. Move the router from right to left (climb-cutting) to minimize tear-out.

Caution: Climb-cutting is hazardous in heavier cuts, and isn't recommended. Use it only for light cuts like this one.



C Glue a hardwood strip in the rabbet to make a durable edge. Once rounded over with sandpaper, the strip is practically invisible.

6 Join Shelves with Only One Setup

Joining shelves to the sides of a cabinet can eat up a lot of precious shop time. Dadoes work well, but you've got to set up a saw or a router to make a dado exactly the right width, and then you have to worry about whether the dado will show on the front of the case. If you don't want to see it, you've got to make a

stopped cut, and that means even more fussing around.

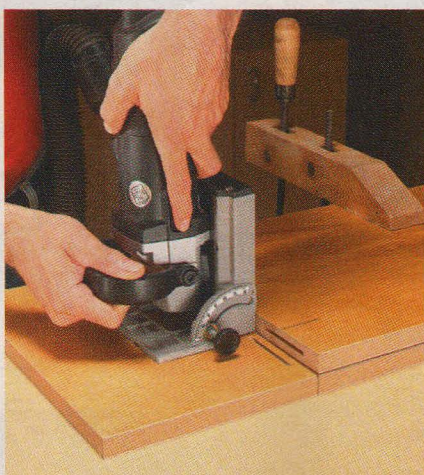
Biscuits get the entire job done quickly, and the joint is very strong. Layout is simple, because there's virtually no setup. Better yet, the joint doesn't show. Reserve dadoes for shelves that need to take a very heavy load. For all other shelves and dividers, use biscuits.

Layout is nothing more than drawing a short line on the edge of your case, indicating where the top of the shelf goes. Clamp the shelf right on the line (Photo A). Draw lines on the shelf to indicate the center of each biscuit slot. Pick up your biscuit joiner, set it to the #20 size and cut slots in the shelf. Stand the machine up on end and cut slots in the case side (Photo B). That's it.

Both slots are registered from the bottom of your machine. When you stand up the shelf and put in biscuits, the shelf will sit exactly on your pencil line. Seems too easy, doesn't it?



A Cut biscuit slots in the end of the shelf first.



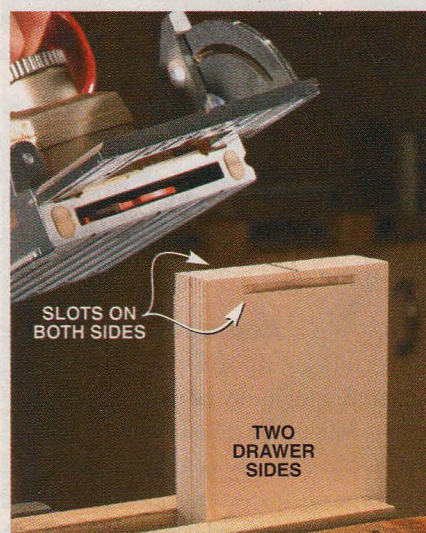
B Stand your plate joiner on end to cut slots in the side of the case. The end of the shelf is a built-in straightedge.

7 Simplify Drawer Making

Why bother with fancy joinery when biscuits will hold together a drawer box just fine? Save the dovetails for show pieces, or for when a large drawer rides on wooden supports and must be super-strong. If you're using metal slides and a false front, biscuits are perfect. The joint doesn't show, and has enough strength for many years of use.

Half-inch Baltic birch plywood and #0 biscuits are a good combination for making drawers. This plywood has very few voids, so its edges generally look good. The slot for a #0 biscuit goes into 1/2-in.-thick stock without coming through the other side.

To make the drawers, draw layout lines down the center of each piece. Cut slots in the ends of the front and back pieces (see page 47 for a jig to hold narrow work). Cut slots in the faces of the side pieces. It's tricky to balance a plate joiner on the end of 1/2-in. stock, though. To make it easier, simply clamp two pieces together. You can cut slots in two pieces with one setup.



Two slots are easier to cut than one. Clamp thin boards together to make a wider bearing surface for your plate joiner.

8 Quick Case Construction

There's nothing faster than biscuits for assembling a simple case. You can cut slots for one case in about the same time it takes to set up a dado set in a tablesaw. Add a back or a face frame to the case, and you have a very strong unit.



Make invisible corner joints super-fast with a plate joiner.

If you've been using pin nails or screws for simple casework, consider this additional benefit: Biscuits are completely invisible; nothing shows on the inside or the outside; there are no nail holes to putty or screws to plug.

When you cut into the side of the plywood, use a thick support board to help balance your plate joiner. A 2x4 milled square works great; it's easy to cut to length as needed, and then toss it when you're done. A 2x4 is just wide enough so your clamps don't interfere with the base of the plate joiner.



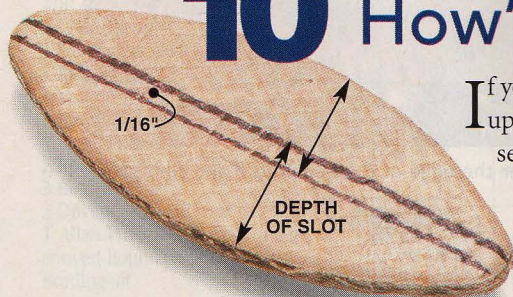
9 Sort Your Biscuits by Thickness

Next time you open a fresh lot of biscuits, try each one in a typical slot and separate them into three piles: too tight, too loose and just the right fit. Put each pile into a plastic bag, label it, and you'll be ready to go for the next glue-up.

Each size has an ideal use. Thick biscuits work

best where exact alignment is critical, such as edge gluing boards (see page 48). Save loose biscuits for complicated glue-ups, where it may be 10 minutes or so before you can finally squeeze all your joints home with clamps. Use the fits-just-right biscuits for everything else.

10 How's Your Depth of Cut?



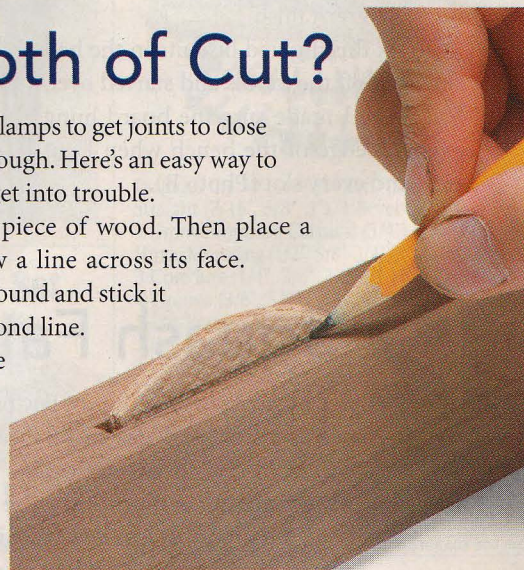
If you need to crank hard on your clamps to get joints to close up, your slots may not be deep enough. Here's an easy way to set up your machine *before* you get into trouble.

First, cut a slot in a scrap piece of wood. Then place a biscuit in the slot and draw a line across its face.

Remove the biscuit, flip it around and stick it back in the slot. Draw a second line.

Pull the biscuit out and see

what you've got. The pencil lines should be about 1/16-in. apart, meaning that each slot is about 1/32-in. deeper than half the width of the biscuit. If your pencil lines are closer together, the slot isn't deep enough. Most plate joiners have an adjustment screw for changing the slot's depth, but you may have to fish out your owner's manual to figure out how it works!



MISALIGNED
EDGE

BISCUIT

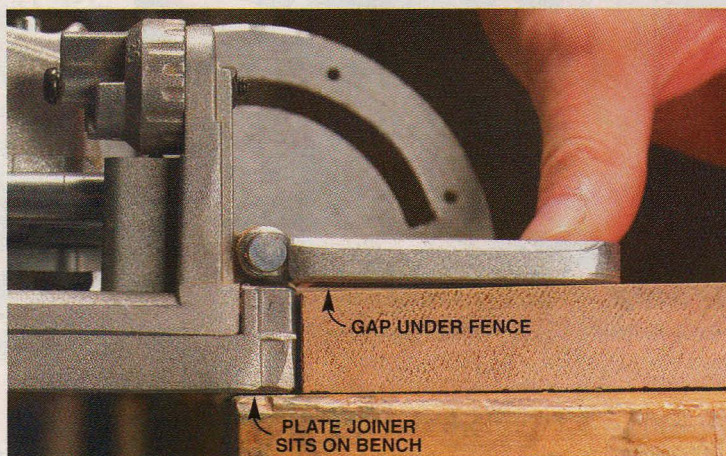
Oops!

11 The Mysterious Misfit

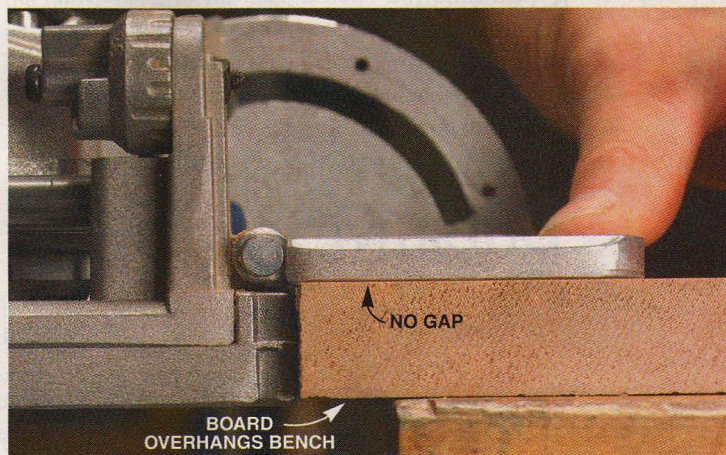
I was cutting slots for a long edge joint the other day, and everything was humming right along. But, when I put the boards together, they didn't line up worth a darn!

Turns out I made a very simple mistake. All along I thought my plate joiner's fence was sitting on top of the board (Photo A). Nope. On some cuts, the bottom of the plate joiner must have been sitting on the bench instead. The board was a bit bowed, so I ended up making slots at different heights. That's why the boards weren't flush.

To fix this, I glued biscuits in the bad slots, cut off the excess and started over. This time I made sure the board hung over the edge of the bench when I cut each and every slot (Photo B).



A Slots may not line up if your plate joiner sits on the benchtop. There may be a small gap under the fence.



B Hang your boards over the edge of the bench to make consistent slots every time.

12 Squash Fat Biscuits

If you're down to the last few biscuits and they're all too fat, don't give up on them. You can squeeze thick biscuits between the jaws of a vise to make them thinner. A machinist's vise works best.

That's more or less how biscuits are made in the first place, after all. They're simply pieces of

compressed beech. Why the squish? Dry biscuits are made to easily fit into a slot. When they come into contact with the moisture in glue, they expand and lock tight. Compressing them a bit more in your vise is perfectly fine. **AW**

Umbrella Stand

By
Dave Munkittrick

*Build this simple,
elegant stand
and you'll have
it made in the
shade come
summer.*



Our lightweight yet sturdy cedar stand acts as an attractive cover for the weighted base.

Market umbrellas have a certain magical quality to them. Whether you're ducking in out of a soft summer rain or seeking relief from the noonday sun, once you slip under that protective canopy, a cozy, intimate atmosphere invites you to sit down and relax for a while.

Our cedar stand is the perfect complement to the brightly colored market umbrellas that have become so popular. Weighted umbrella stands typically sell for \$300 to \$400, but you can build ours for less than \$70. And, unlike typical patio tables that force most of the sitters out in the open, the small footprint of our cedar stand keeps you inside the umbrella's sheltering shade.

What You'll Need to Get Started

Our stand can be built in a day using home center materials. We chose "select"-grade cedar decking for the top and lower-cost #2 cedar for the base. Plan to buy a little extra of the lower-grade cedar so you can harvest the clear wood between the knots. Pick straight-grained boards, especially for the stiles (A and B). This helps make the butt joints where the sides come together almost invisible.

The T 1-11 plywood used for the panels is typically used for house siding. It has a rough surface and is made with weather-resistant adhesives so it's perfectly suited for staying outside in the elements. Be sure to get the stuff

that doesn't have grooves cut in it.

Butt joints and biscuits are what we used to build this sturdy little stand. But, the only tools you need to complete the project are a tablesaw and a jigsaw. A biscuit joiner, miter saw, circular saw and a 2-1/8-in. holesaw are nice to have, but none of these tools are required. If a biscuit joiner and miter saw are still on your wish list, the angled cuts can be made on your table-saw and the side-panel frames can be glued up with simple butt joints. Biscuits help keep the frame parts aligned, but the plywood panel screwed to the back (Fig. A) will reinforce the joints even without biscuits. Dowels work just fine for assembling the top and a jigsaw is a good substitute for the hole-saw and circular saw.

Working With Cedar

A couple things to keep in mind when working with cedar: First, cedar is very prone to chip-out when cross cut. Always use a sharp, fine-tooth blade. And even though a miter saw is often called a chop saw, don't "chop" the wood. Take it slow and easy for smoother cuts. The second thing to remember is that cedar can be very wet. I strongly recommend you rough cut the boards oversize first, then stack the pieces so air can circulate around all the surfaces. Cedar dries fast, and the shorter lengths will dry even faster—a few weeks should do the trick.



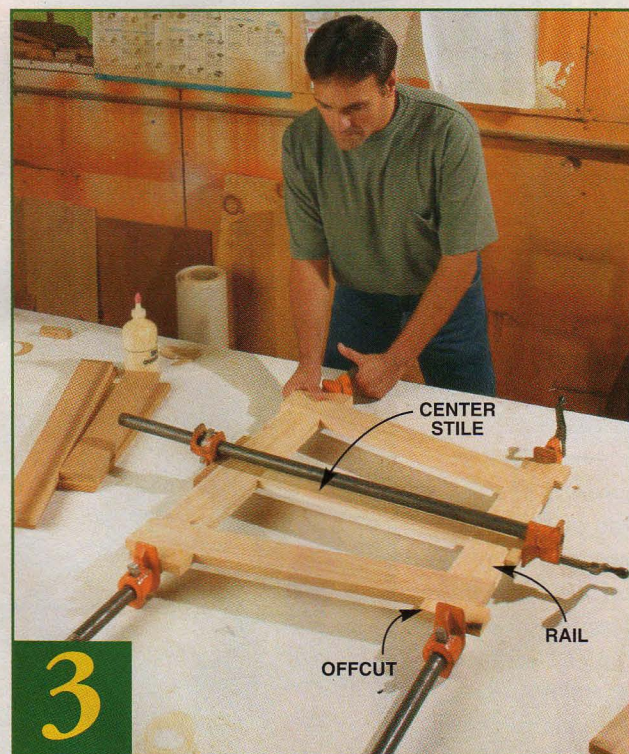
Umbrella Stand



1 Cut the angled frame members (A through E). Use a 9-degree angled stop block to fit the angled ends of each frame member. The stop block ensures that all similar parts of each frame are the same length. That in turn ensures that all four sides of the stand will be exactly the same size and have the same angles.



2 Cut biscuit slots with a simple hold-down jig. The jig's base completely supports the joiner base. The toggle clamp holds the board down flat on the jig allowing you to keep both hands on the joiner for quick, accurate and safe slot cutting. Any clamp can be used to hold down the board; the toggle clamp just speeds things up.

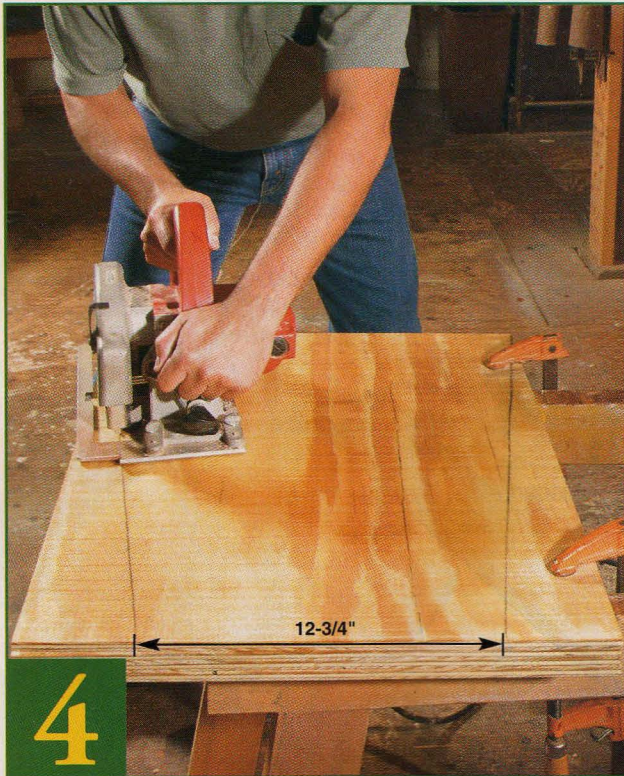


3 Assemble the frames starting with the center stile (C) and the top and bottom rails (D and E). Use water-resistant glue and clamp the stiles onto the rails. Offcuts from the angled ends make perfect clamp pads that won't slip as clamp pressure is applied. After the glue has dried, sand the frames to remove any unevenness at the joints.

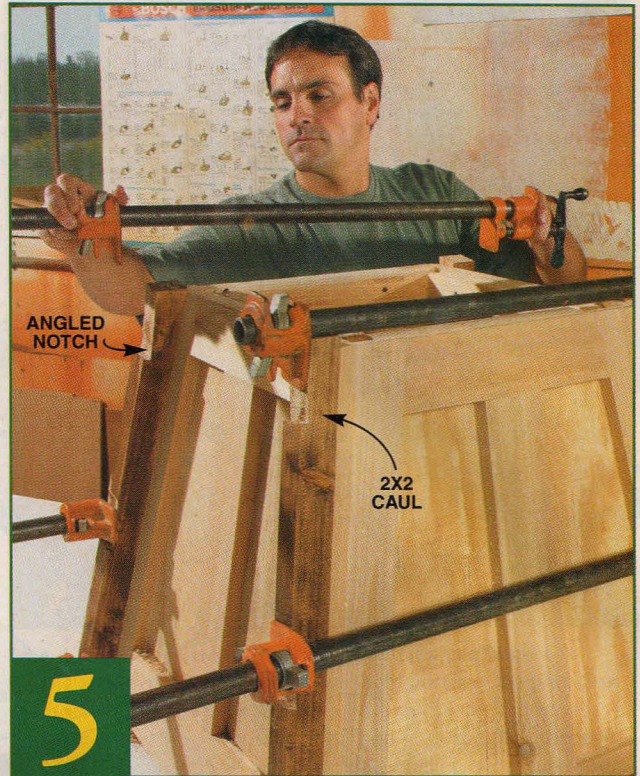
Build the Umbrella Stand

1. Make two pair of side panels. One with skinny stiles (B) and one with wide stiles (A).
2. Cut the angled ends on all the frame pieces (A, B, D and E) at 9 degrees (Photo 1). Note: After the first cut is made on each rail, you'll have to flip it over and make the second cut from the back side to avoid changing the angle setting on the saw.
3. Assemble the frames with biscuits and a water-resistant glue like Tite Bond II (Photos 2 and 3).
4. Cut the plywood panel blanks according to the Cutting List, page 59. Cut the tapers (Photo 4) with a circular or jigsaw and screw them to the backs of each frame.
5. Assemble the stand with water-resistant glue (Photo 5). Use glue blocks to help reinforce the butt joints (Fig. A, Detail 1).
6. Glue up the top (Photo 6). Cut the hole for the galvanized pipe with a 2-1/8-in. hole saw. Drive a wedge of wood between the two middle boards to give the drill bit a place to bite. A jigsaw can be used if you don't have a hole saw laying around.
7. Set the pipe (K) in a bucket of concrete (Photo 7).
8. Place the bottom half of the umbrella pole in the pipe and drill a 1/4-in. hole through the pipe and pole. Use a 1/4-in. eye-bolt to secure the lower half of the umbrella pole to the base.
9. Set the cedar stand over the cement base and screw on the top half of the umbrella.
10. Enjoy the shade and a cool drink—you deserve it!

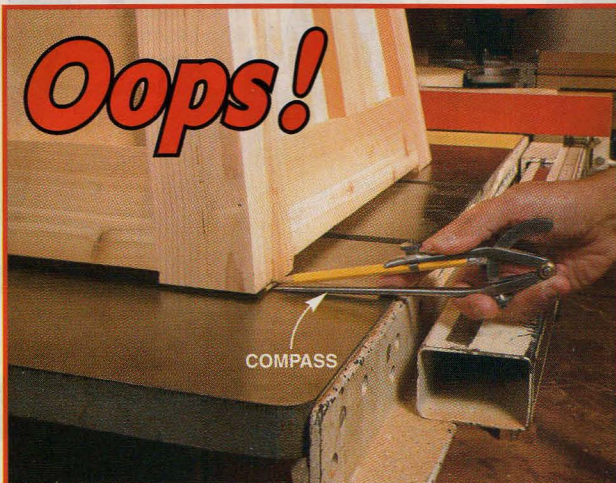
Umbrella Stand



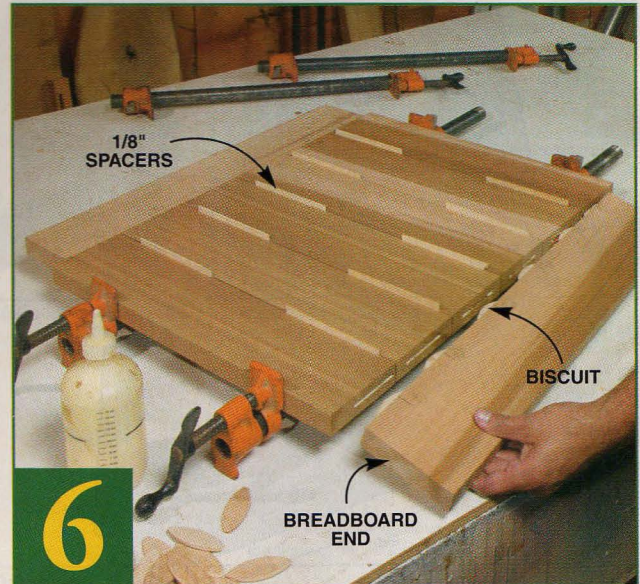
Cut the tapers on all four plywood panels at the same time. Close counts with these cuts. A circular saw works best but a jigsaw will get the job done. Clamping all four blanks (J) together onto a pair of sawhorses keeps the parts from slipping and both of your hands safely on the saw. After they're cut, fasten a panel to the back of each frame.



Assemble the base with notched cauls. Notches on the edge of a 2x2 create parallel clamping surfaces so your clamps stay put. Use an angled offcut as a pattern to lay out the notches. Cut them out with a jigsaw, bandsaw or by hand. Pin the sides with a couple of 4d galvanized finish nails at each joint to keep the sides in place while clamping. Add glue blocks and cleats (H) (Fig. A, Detail 1).



Shoot! We tried clamping the stand without using nails to pin the panels and one of them slid up under clamp pressure. The result: Uneven feet! Because the glue was set there's only one fix. Put the stand on a flat surface (like your tablesaw). Set a compass to match the widest gap, and run a line around each foot, referencing the compass off the tablesaw top. Finally, cut or sand the feet flush to the scribe line for a neat appearance. No one will ever know.



Glue up the top using 1/8-in.-thick spacers to set an even gap between the boards. Biscuits make quick work of fastening the breadboard ends, but dowels would also make a strong joint. Trim the top to final size (Fig. A). Sand the top smooth, then turn the stand upside down on your bench with the top underneath. Secure the top with screws through the cleats.

Power Sharpening System

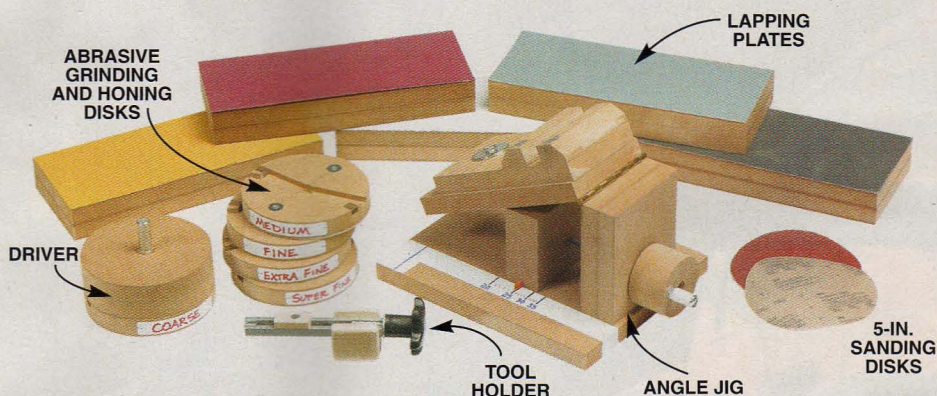
By Tom Caspar

I'm crazy about sharp hand tools. When edges are perfect, these tools sing in your hands. When they're dull, you might as well hang them up.

I've been looking for the ultimate sharpening system for years, one that can quickly and accurately grind and hone a perfect edge. One day I looked at my drill press and electric sander and a light bulb went on. Wow! Combine the slow speed, power and accuracy of the drill press with the latest in abrasives technology, and you've got it made. This system is the result of that brainstorm. Goodbye to the stone age!

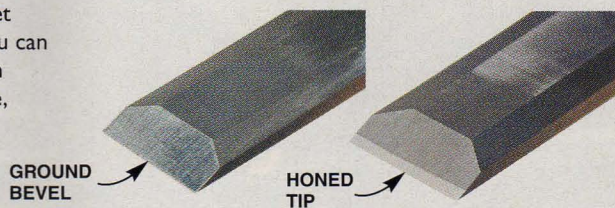
It's Cheap...

Our shop-made sharpening system costs less than \$50 in materials and hardware. All you need is an ordinary drill press and the accessories shown below.



...It Grinds and Hones

With this system, you get two machines in one. You can grind out nicks, and then hone a super-sharp edge, with only one setup.



...and It'll Sharpen Everything

This system will handle any edge tool from the smallest chisel to the widest plane iron (1/8-in. wide to 2-5/8-in. wide). Dial in any angle from 18 to 37 degrees.





How it Works

Step 1



Flatten and smooth the back of your edge tool on a flat block before sharpening the bevel. You only have to do this once in a tool's lifetime. Our system uses a series of five double-sided MDF blocks, called lapping plates, that are covered with sandpaper.

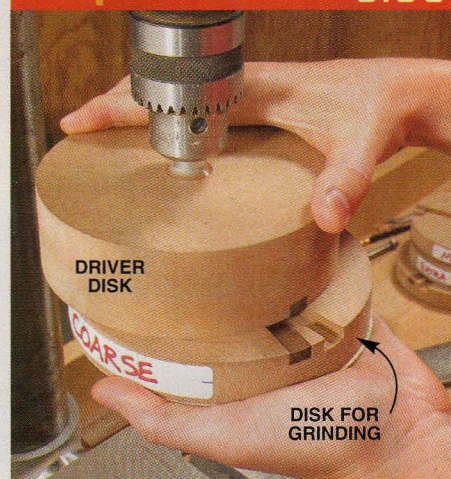
Step 2



Set your drill press to its lowest speed. Our jig converts any drill press, whether bench or floor-model, into a super-slow-speed grinder. You'll never overheat another tool.

Step 3

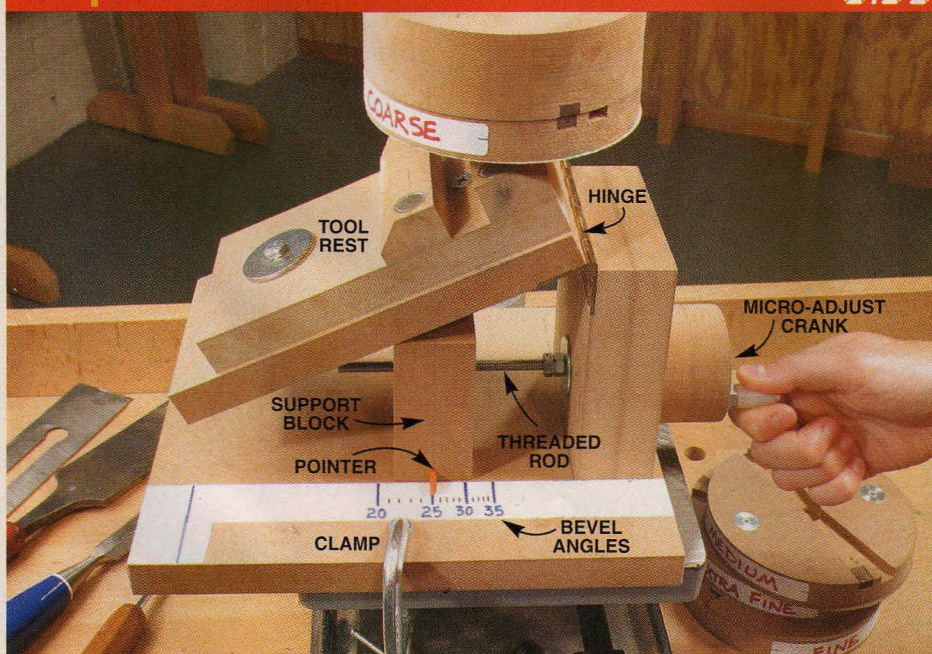
0:05



Insert an abrasive disk into the driver disk. This system uses five interchangeable wooden disks for grinding and honing. They are covered with inexpensive, easy-to-find 5-in. sandpaper disks for electric sanders. The disks go from coarse to super-fine.

Step 4

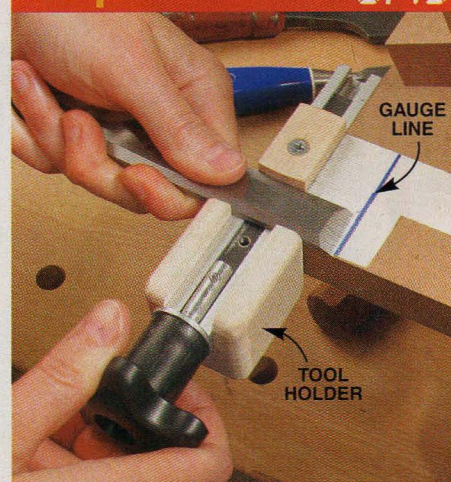
0:35



Turn the micro-adjust crank until the pointer reads 25 degrees. The tool rest is hinged and rests on a support block. Turning the crank moves the support block back and forth along a threaded rod, changing the angle of the tool rest. Clamp the jig to the drill press table in two places, front and back.

Step 5

0:45



Clamp your tool in a shop-made holder. Turning the knob locks it in good and tight. Set the tool's projection from a gauge line scribed on the jig's base. Close is good enough.

Power Sharpening System

Step 6

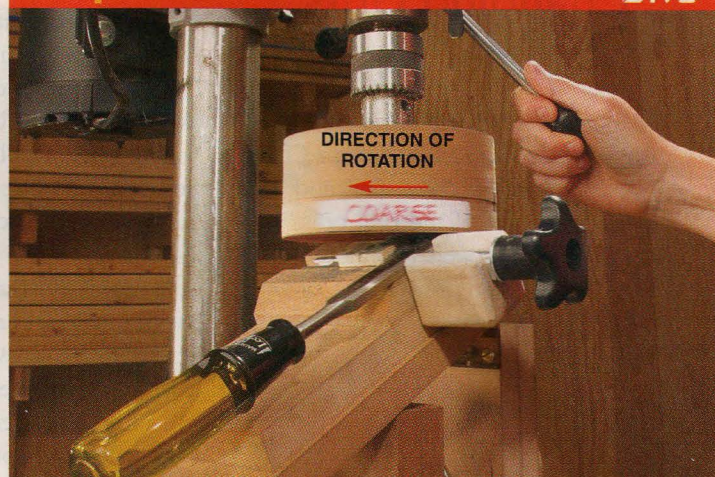
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Slide the holder into the jig's guide slot. Once in place, the tool and its holder are firmly held by two powerful rare earth magnets.

Step 7

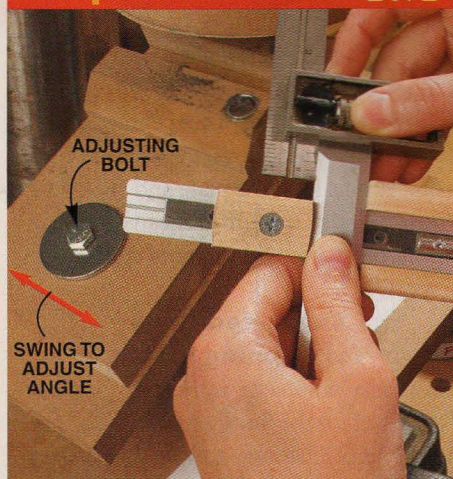
2:10



Turn on the drill press and slowly lower the abrasive disk. Take it easy! It only takes a little pressure to remove quite a lot of metal. Raise the disk and turn the drill press off after one or two seconds of grinding.

Step 8

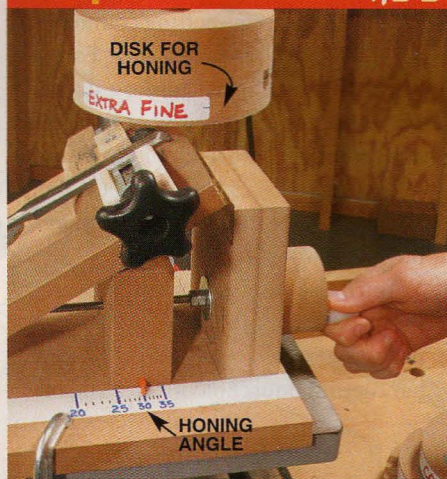
3:10



Withdraw the holder from the jig. Check the edge to see if it's square. If it's not, rotate the top of the jig by loosening the adjusting bolt. You can fine-tune this adjustment until your edge is precisely square, but with most tools, close is good enough. Keep grinding until you reach the end of the bevel.

Step 9

4:30

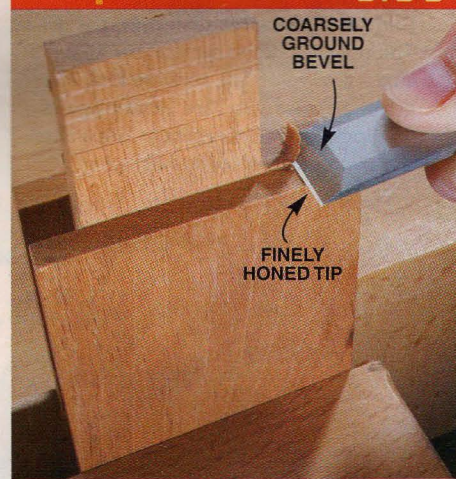


Replace the coarse disk with a fine disk. Rotate the micro-adjust crank to create a higher, 30-degree angle. Now you're only sharpening the tip, rather than the whole bevel. That's the secret to making a sharp edge, fast.

Turn the machine on and hone for a second or two. Turn the machine off and inspect your progress. Remove the faint wire edge on the back of your tool with the finest lapping plate.

Step 10

5:00



Go back to work. Time elapsed? Five minutes or so, with no oily or watery mess to clean up. Simply wipe the fine sanding disks with rubbing alcohol to clean off the metal residue.

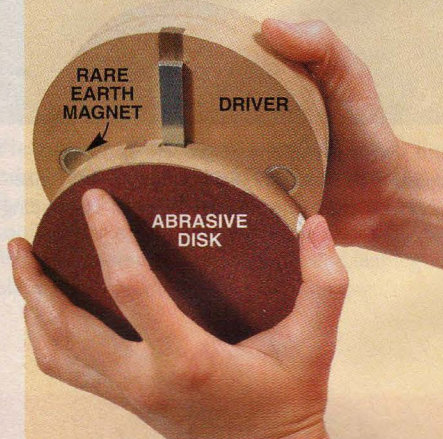
If you're done sharpening, free up your drill press by removing the driver disk. Store all the parts of the system in a small box.

How to Build It

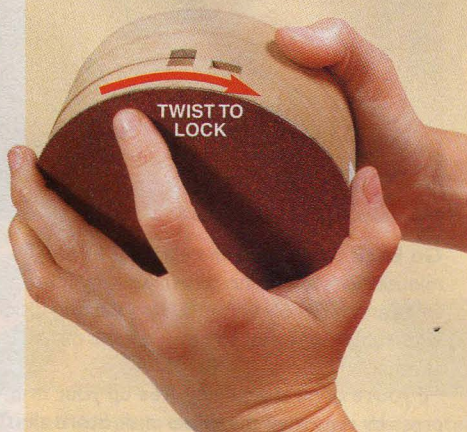
Changing Grits Takes Only Seconds

A unique twist-and-lock design lets you change grits as easy as changing a CD.

We've taken the driver unit and an abrasive disk out of the drill press to show you how they work together. When you're actually sharpening, the driver stays in the drill press.



Slide the abrasive disk onto the driver. The driver contains a metal bar that fits into a groove on the abrasive disk. The driver also has two rare earth magnets that lock the abrasive disk in place after the two disks are twisted together.



Twist the abrasive disk. It locks into place automatically in a second groove. To release the abrasive disk, simply turn it in the opposite direction and slide it off.

Common Hardware, Tools and Skills

All the parts of this jig are made from 3/4-in. medium-density fiberboard (MDF), primarily because it's very flat. Baltic birch or ApplePly plywood would work well, too (see Sources, page 110), but shop-grade birch plywood won't cut the mustard. MDF is fairly inexpensive (about \$30/sheet) and you'll only need half a sheet or a bunch of scraps.

Most of the hardware for the jig is garden-variety stuff (see Shopping List, page 74). A few crucial items can only be found in a catalog (see Sources, page 110.) Altogether, the hardware costs about \$30.

As for power tools, of course you'll need a drill press, but it doesn't have to be a floor model. A 10-in. benchtop will do, and you can buy one for less than \$100. (The only requirement is that the drill press must have at least 10-1/8 in. of clearance between the bottom of the chuck and the top of its table.)

You'll need a set of twist drill bits up to 1/2-in. dia., a metal-cutting countersink, 1/2-, 5/8-, 3/4- and 1-in.-dia. Forstner bits and a 3-in.-dia. sanding drum. A self-centering hinge bit is optional (see Sources, page 110). You'll also need a tablesaw and a stacking dado set. A bandsaw helps with cutting the round parts, but a jigsaw is okay.

You'll also need a hacksaw with an 18-tooth-per-inch blade, an 8- or 10-in. flat bastard-cut file, an 8-32 NC tap and handle and household lubricating oil.

Getting Started: Laminate the MDF

Begin building the sharpening system by gluing together all the parts that are made from two thicknesses of MDF.

1. Rough cut pieces for the driver (A1), the fixed support (C1), the moveable support (C2), the crank (C4) and the lapping plates (E1) (see Cutting List, page 74).

2. Clamp and glue the pieces together

(Photo 1, page 68). It's okay if the pieces don't perfectly align while you're gluing, because they're meant to be at least 1/2-in. oversize in width and length.

Make the Lapping Plates

Now make a set of flat blocks, or lapping plates, for flattening and polishing the back side of your chisels and plane irons. Lapping a tool requires removing a fair amount of very hard steel. The secret to getting this tedious job done quickly is to use many different grits of sandpaper, just as if you were sanding wood. Our lapping system uses a set of five double-sided plates made from laminated MDF. Each is the size of half of one sheet of standard sandpaper.

1. Cut the blanks (E1) to final size.
2. Flatten both faces of each plate by sanding them on the top of your tablesaw (Photo 2, page 68).
3. Spray the plates with three or four coats of clear lacquer. Sand the lacquer smooth.
4. Tear your sandpaper into halves and coat each piece *very lightly* with a spray adhesive, such as 3M Super 77. Apply the paper to the lapping plates (Photo 3, page 68). When your sandpaper wears out, simply peel it off the plate and stick on a new piece. Clean off adhesive residue from the plates with mineral spirits.

Suggested Grits for Lapping Plates

Ordinary sandpaper works fine for most grits, but for the finest ones go with special microfinishing paper, with grit sizes measured in microns (see Sources, page 110). Each lapping plate has two grits, one on each side.

Coarse: 100 and 120

Medium: 150 and 180

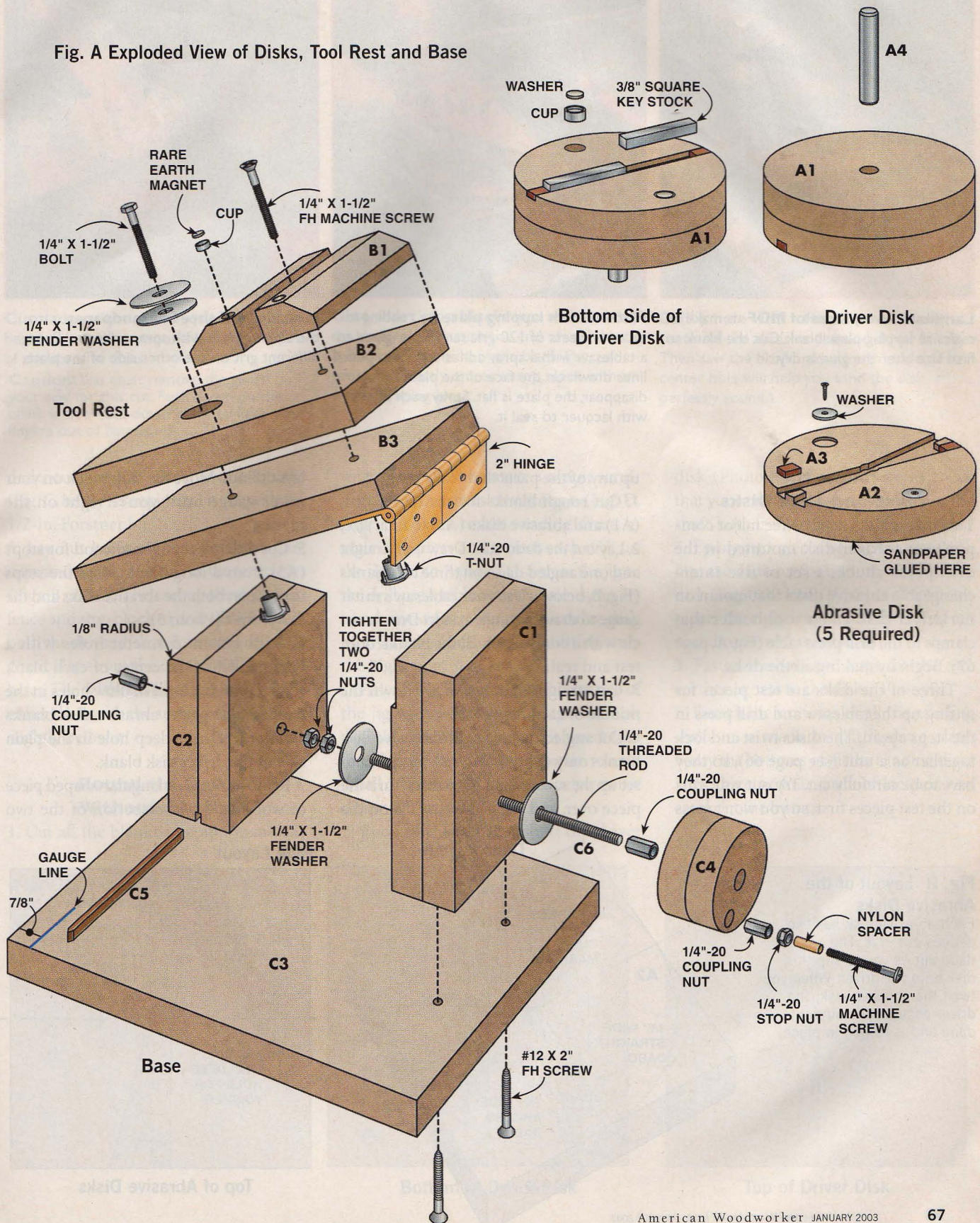
Fine: 240 and 320

Extra-Fine: 400 and 600

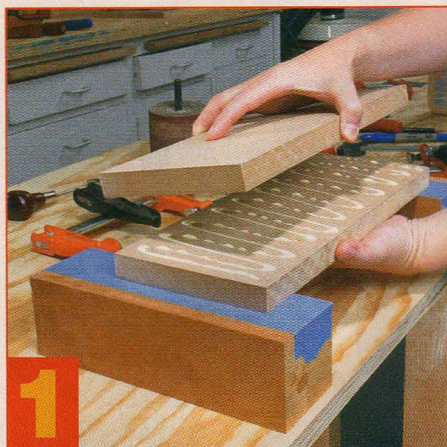
Superfine: 15 micron and 5 micron.

Power Sharpening System

Fig. A Exploded View of Disks, Tool Rest and Base



How to Build It



1 **Laminate two pieces of MDF** to make an oversize lapping-plate blank. Cut the blank to final size after the glue is dry.



2 **Flatten each lapping plate** by rubbing it on two sheets of 120-grit sandpaper glued to a tablesaw with a spray adhesive. When pencil lines drawn on the face of the plate disappear, the plate is flat. Spray each plate with lacquer to seal it.



3 **Mount a half sheet of sandpaper** onto the lapping plate with spray adhesive. Put a different grit on the other side of the plate.

Make the Twist-and-Lock Disks

This sharpening jig has three major components: a driver disk mounted in the drill press chuck, a set of five interchangeable abrasive disks that mount on the driver disk and a tool holder that clamps to the drill press table (Fig. A, page 67). Begin by making all the disks.

Three of the disks are test pieces for setting up the tablesaw and drill press in the steps ahead. The disks twist and lock together as a unit (see page 66), so they have to be carefully cut. Try out your cuts on the test pieces first, so you won't mess

up any of the parts that really matter!

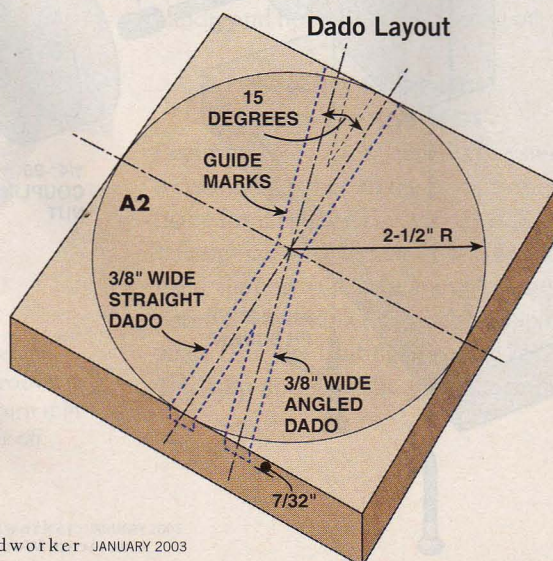
1. Cut rough blanks for the driver disk (A1) and abrasive disks (A2) to final size.
2. Lay out the dado cuts. Draw one straight and one angled dado on three test blanks (Fig. B, below). Use your tablesaw's miter gauge to draw the angled dado. Draw a circle with a compass on all the blanks, both test and real.
3. Cut straight dados exactly down the middle of each blank.
4. Cut angled dados in the abrasive disk blanks only (Photo 4). Use a test piece to set up the saw. Make a partial cut, turn the piece over, and see if the cut falls on the

layout lines. Move the stop block on your miter gauge until you're right on the money.

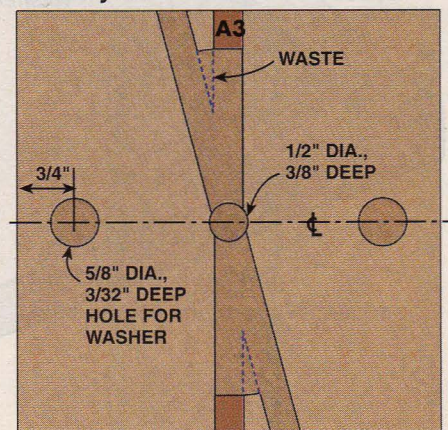
5. Cut little pieces of hardwood for stops (A3) from a long blank. Glue the stops in place on both the abrasive disks and the driver disk (Photo 5).
6. Drill 1/2-in. diameter holes with a Forstner bit in the center of each blank (Figs. B and C). Drill shallow holes in the dadoed side of the abrasive disk blanks (Photo 6). Drill a deep hole in the plain side of the driver disk blank.
7. Remove a small triangular-shaped piece of wood at the intersection of the two

**Fig. B Layout of the
Abrasive Disks**

Each abrasive disk has two dados cut in it. The angled dado allows you to slip this disk onto the driver. When you twist the abrasive disk, the driver engages the straight dado and is locked in place.



Hole Layout



Top of Abrasive Disks



Cut dados in a set of square blanks to begin making the twist-and-lock mechanism of the abrasive disks.

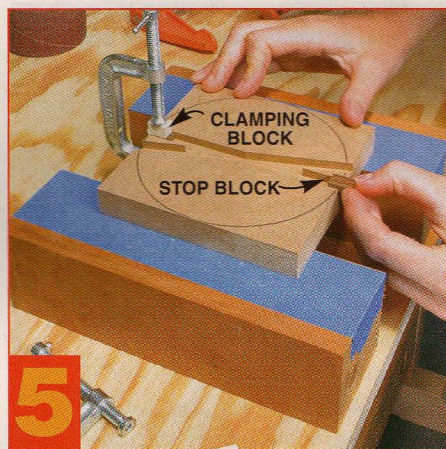
Caution: You must remove the guard on your saw for this cut. Push down on the blank with a hold-down block to keep your fingers out of harm's way.

dado cuts on the abrasive disk blanks (Fig. C, below). Simply drill it out with the 1/2-in. Forstner bit.

8. Lay out holes for rare earth magnet cups and washers on one of the test pieces (Figs. B and C). Then set up the drill press fence and stop block to drill these holes in both the driver disk and sanding disks. Be particular about the depth of all of these holes. The washers and magnets should be either flush with the surface of the disk or slightly below it.

Round the Disks Without a Lathe

1. Cut all the blanks into approximately



Glue short stop blocks into both ends of the dados. Make sure the end of each block is flush with the side of the blank. Put pressure directly on each stop block with a small clamping block.

round shapes. Then make a simple sanding jig for the disks to rotate on (Fig. D, page 71). Put a coarse sanding drum in your drill press and mount each disk on the jig (Photo 7, page 71). Secure the jig to the drill press table with a single clamp. By hand, rotate the roughly circular disk against the sanding drum, hitting only the high spots.

After each rotation, tap the corner of the jig with a mallet to nudge the disk slightly closer to the drum. It won't take long before the disk is perfectly round. Small differences in diameter between the disks won't matter.

2. Epoxy the shaft (A4) into the driver



Drill a hole with a Forstner bit in the center of the abrasive disk and driver blanks. Then saw the blank into a rough circle. (The center hole will help you sand the disk perfectly round.)

disk (Photo 8). (First, be sure to check that your table is absolutely square to the shaft, both front to back and side to side.)

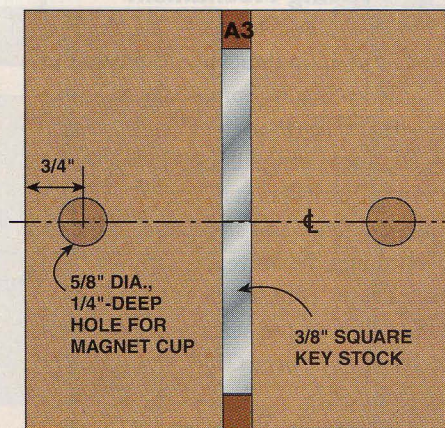
3. Epoxy two pieces of square key stock into the dado on the bottom of the driver disk (Fig. C, below). If you can't find two pieces the right length, buy three and cut one shorter with a hacksaw.

4. Fasten washers and cups for the rare earth magnets to the disks (Photo 9).

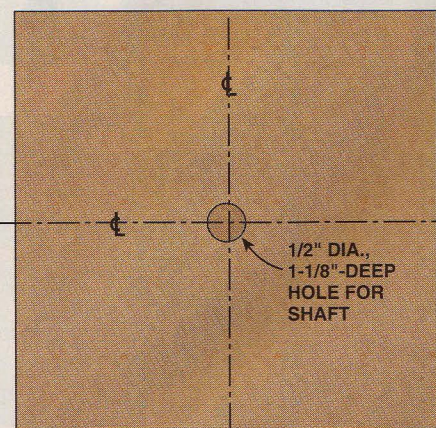
5. Flatten the bottoms of all the sanding disks on a medium-grit lapping plate. Spray the bottoms of all the sanding disks with three or four coats of lacquer, and sand out the bumps.

Fig. C Layout of the Driver Disk

The driver disk has one dado to receive glued-in pieces of metal key stock. The key stock engages the dados cut in the abrasive disks, so the two disks turn as a unit.



Bottom of Driver Disk



Top of Driver Disk

How to Build It

**This
system
practically
guarantees
you can:**

- Grind without overheating
- Dial in any bevel angle
- Hone perfectly straight edges



Suggested Grits for the Sanding Disks

Use standard 5-in. sanding disks without holes. You can use disks with an adhesive backing or make your own from regular sheet sandpaper and a low-tack spray adhesive. Disks come in standard sandpaper grits or in microns.

Coarse: 80 grit
Medium: 120 grit or 100 micron
Fine: 320 grit or 30 micron
Extra-fine: 600 grit or 15 micron
Super-fine: 1200 grit or 5 micron

Make the Adjustable Base and Tool Rest

1. Rip the blank for the fixed support (C1) and moveable support (C2) to final width.
 2. Cut the rough blanks for the two guides (B1), the table that adjusts for the squaring of a tool's bevel (B2) and the table that adjusts the angle of the bevel (B3). Also, rip a piece for the base (C3) and trim it slightly oversize in length.
 3. Cut a 45-degree bevel along one side of the guide blank (B1) (Fig. E, page 71).
- Caution:** Tilt your tablesaw blade away from the fence, so there's no kickback hazard. The blank is oversized in width so there's plenty of support for this cut. Then reset the tablesaw blade to 90 degrees and rip the blank to final width.
4. Crosscut all pieces to final length.

Drill Holes for the Tilting Mechanism

1. Test drill a hole for a 1/4-20 coupling nut. The coupling nut should fit tight in the hole, so it can't spin. Make this hole 1/64-in. smaller than the maximum outside diameter of the coupling nut, measuring across its points.
2. Set up a fence and stop block to drill a hole through the moveable support (C2) with this bit (Fig. H, page 73). Drill a smaller hole in the same place through the fixed support (C1) for a piece of threaded rod.
3. Cut the blank for the micro-adjust crank

(C4) to final square size and drill holes for two coupling nuts and a threaded rod (Fig. J, page 73). Cut the crank into a rough circle and sand it round, as you did with the disks.

4. Drill holes through the base (C3) and pilot holes into the fixed support for the screws that hold the two pieces together (Fig. G, page 73).

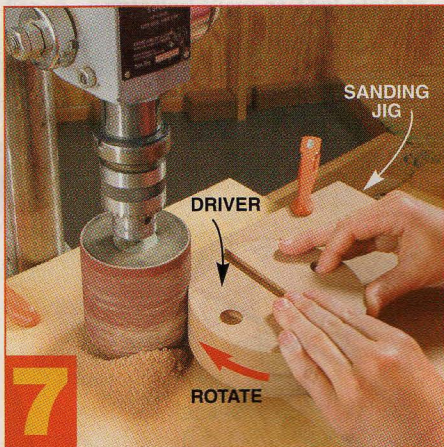
5. Cut a shallow kerf in the bottom of the movable support for a pointer (C5) (Fig. H). Cut the pointer, glue it in place and file a bevel on its end. Radius the top edge of the support with a file or sandpaper.

Install Good Hinges on the Tool Rest

The lower half of the jig is ready to assemble, but first you must dado two parts to receive two high-quality hinges (see Sources, page 110). Typical door hinges don't work, because there's too much slop between the pin and the hinge. That slop will cause the jig to shake while sharpening.

1. Cut dados in the bevel angle table (B3) and the fixed support block (C1) (Figs. E and H).
2. Place the hinges in the dados and drill 3/4-in.-deep pilot holes for the screws (Photo 10).
3. Drill holes in the bevel-angle table (B3) for the adjustment screws and T-nuts. Install the T-nuts.
4. Screw the hinges in place to connect the support block and bevel-angle table. (You may have to file a bit off the end of the screws first so they don't protrude through the bevel-angle table.)
5. Screw and glue this assembly to the base (C3).
6. Glue the two guide blocks (B1) to the bevel-squaring table (B2) (Photo 11). Rip the assembly to final width.
7. Drill holes for rare earth magnet cups in the guide blocks (Fig. E, page 71). Install the cups and magnets. Drill a large hole in the table for the adjustment bolt to pass through and a small hole between the guides for a pivoting bolt.

text continued on page 72



7 Round each disk on the drill press with a sanding drum. Rotate the disk on a sanding jig (see Fig. D, below) to turn it into a perfect circle.



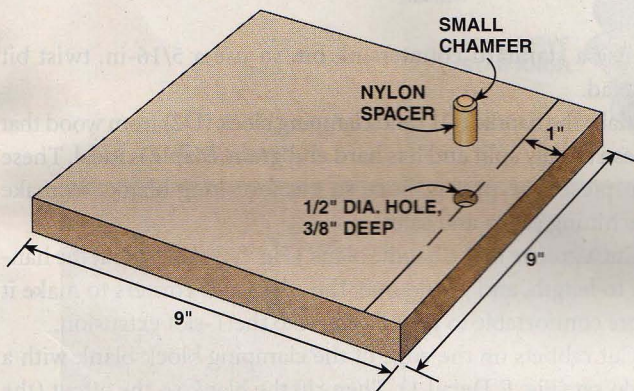
8 Glue a shaft into the driver disk with epoxy. (The shaft is simply a hardware-store bolt with its head and threads cut off.) Lower the shaft into the disk, then lock the chuck in place so it stays put while the glue dries. This ensures that the shaft is absolutely perpendicular in the driver.



9 Screw special magnet washers to the abrasive disks and cups for securing the rare earth magnets to the driver disk.

Also, epoxy metal bars to the driver disk. They're simply square key stock from the hardware store. Now all the disks are ready to go.

Fig. D Drill Press Sanding Jig

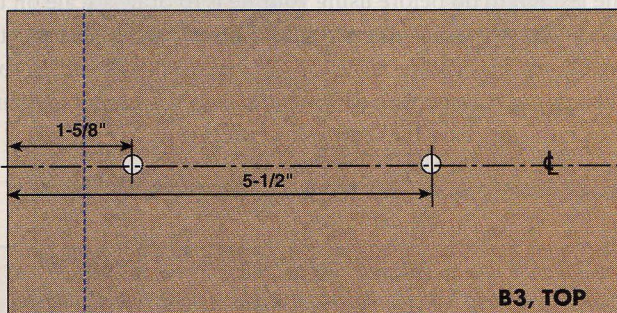
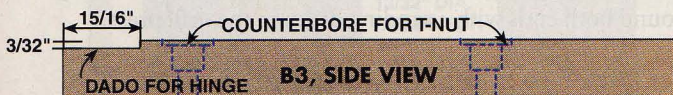


Drill pilot holes for two hinges to begin making the base of the sharpening jig. Use a self-centering bit in the drill press to make perfectly aligned holes.

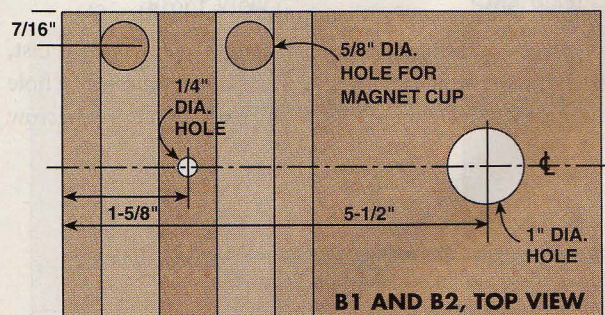
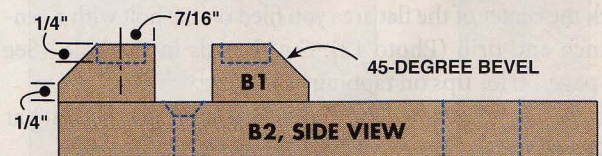
The base is hinged so you can adjust sharpening angles. Two hinges side-by-side are more rigid than a single hinge.



Fig. E Tool Rest Layout

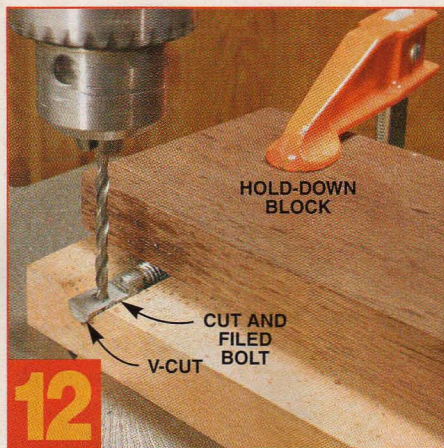
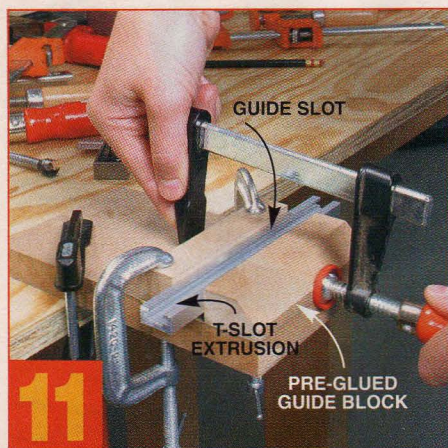


Bevel-Angle Table Layout



Bevel-Squaring Table Layout

How to Build It



11 **Clamp every which way** when you make the part of the jig that receives the removable tool holder. The T-slot extrusion must fit snugly in the jig's guide slot, and the best way to ensure a tight fit is to use the T-slot extrusion itself as a spacer.

12 **Drill through a hardware-store bolt** to make the clamping mechanism for the tool holder. The bolt has its head cut off and a notch filed on the unthreaded portion. The V-shaped cutout in the support block keeps the bolt from rolling while you drill.

13 **Calibrate the angle setting** of your jig with a standard 30-60-90 drafting triangle.

Turn the crank handle until the jig's tilting table lines up with the top edge of the triangle. Make a mark opposite the pointer, and label it "30 degrees." Then line up our scale (Fig. K, page 74) with this mark and transfer the remaining angle settings to the base of your jig.

text continued from page 70

8. Assemble the entire base (Fig. A, page 67). Epoxy the coupling nuts in their holes. Paint or lacquer the whole jig so it's easier to keep clean.

Drill and Tap Holes for the Tool Holder

1. Clamp a machine bolt (D3) in a vise and saw off its head. Then file a notch in one end with a sharp, flat bastard-cut mill file (Fig. F, Detail 3, page 73).
2. Make a V-block to support the bolt. This is simply a 12 in. or so square of MDF with a long V-shaped notch cut down the middle, about 3/8-in. deep.
3. Mark the center of the flat area you filed on the bolt with a center punch and drill (Photo 12). Cut threads in the hole. (See Q&A, page 14, for tips on tapping holes.)
4. Drill and tap holes down the middle of a short piece of flat bar stock (Fig. F, Detail 2).
5. Fasten the bar to the notched bolt with a small screw. Cut off the excess length of the screw and smooth the end with a file.
6. Cut a piece of T-slot extrusion to length (see Cutting List, page 74). Smooth the ends with a file. Drill and countersink a hole near one end (Fig. F, Detail 4). The T-slot extrusion is too narrow

to use a standard countersink bit, so use a 5/16-in. twist bit instead.

7. Make the handle (D1) and clamping block (D2) from wood that doesn't easily split and has hard end grain. Maple is ideal. These two pieces are pretty short, so cut foot-long blanks to make machining easier and safer.

8. Cut a groove in the handle blank (Fig. F, Detail 4). Cut the handle to length, and round over the edges and corners to make it more comfortable to grip. Fasten it to the T-slot extrusion.

9. Cut rabbets on the edge of the clamping block blank with a dado set (Fig. F, Detail 1). Then rip the blank so the offcut (the edge with the rabbets) is 3/8-in. wide and the thickness of the finished clamping block. Drill the screw hole and cut to length. Round both ends with a sanding drum in the drill press.

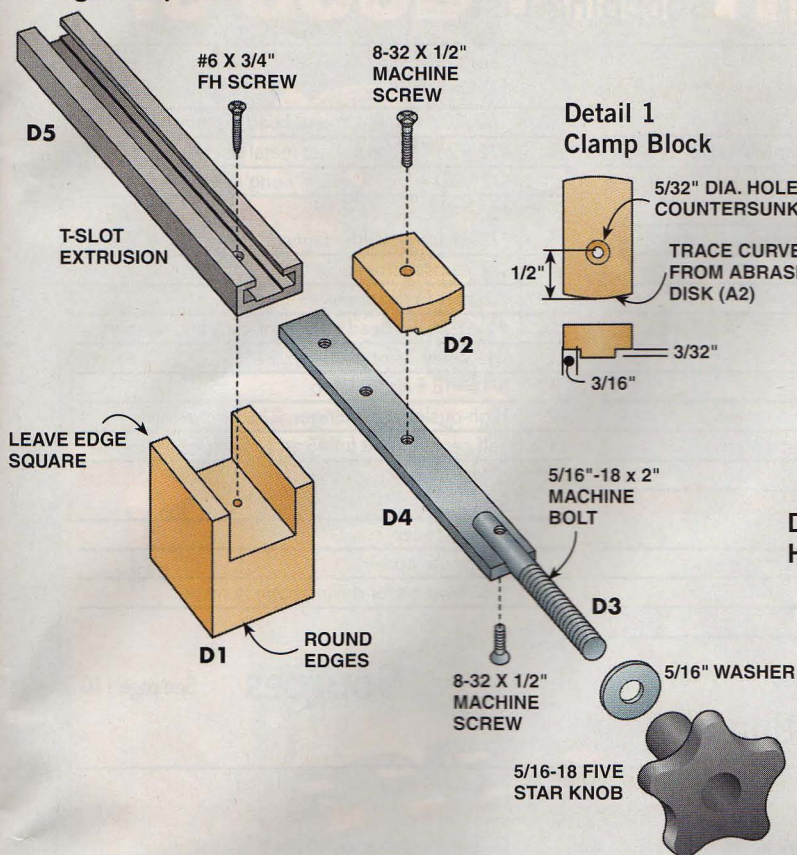
Calibrate the Jig

The last job to do before using your jig is to draw a scale on the base to indicate the sharpening angles (Fig. K). Use a drafting triangle to mark a baseline angle of 30-degrees (Photo 13), then copy and tape our scale in place or draw your own. Also, mark the gauge line on the jig's base for setting your tools (Fig. A, page 67).

What's your biggest sharpening problem? Would this jig help or do you think it's overkill? Send your thoughts to aweditor@readersdigest.com

Special thanks to woodworker Richard Tendick for his help in engineering this jig. Thanks also to woodworkers Dennis Schuster and Pete Bergstrom for their helpful advice.

Fig. F Exploded View of Tool Holder



Detail 2
Bottom View of
Flat Bar Stock

Detail 3
Notched Machine Bolt

Detail 4
Handle

Fig. G Base Layout

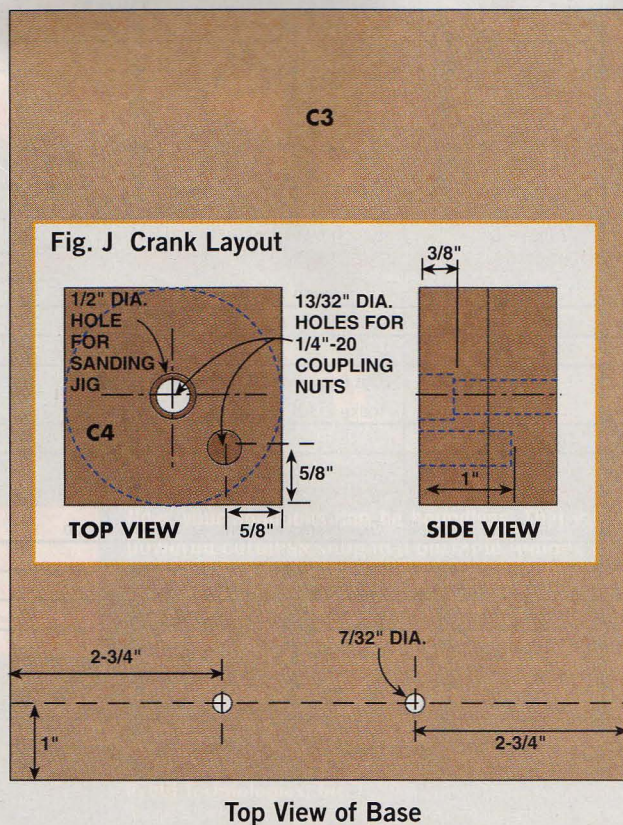
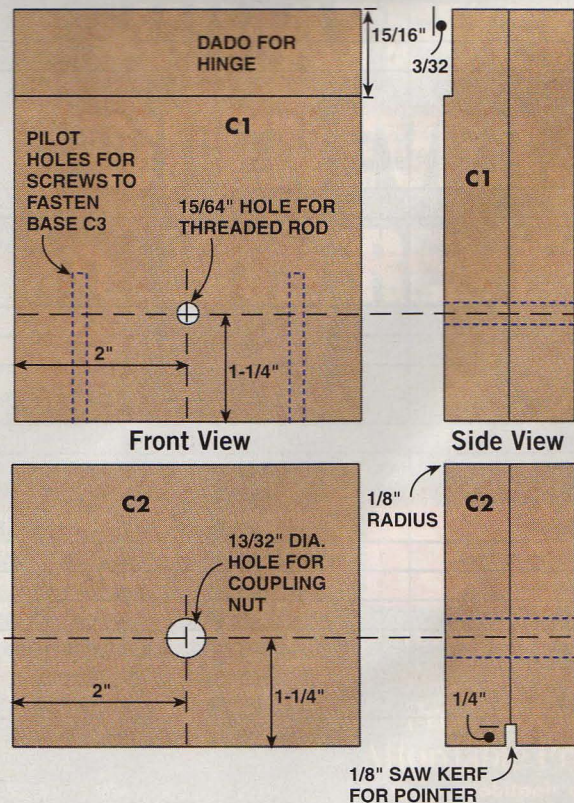
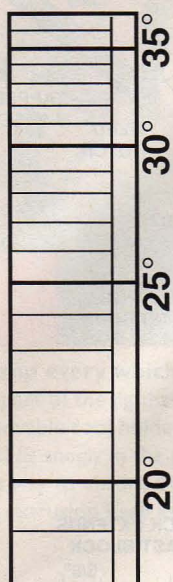


Fig. H Fixed and Moveable Supports Layout



How to Build It

Fig. K Sharpening Angle Scale



Shopping List

Qty. Part

Driver Disk

1	1/2" x 4-1/2" bolt
2	3/8" square key stock, 2" L (or 3 @ 1-1/2" L)

Tool Rest

1	1/4"-20 x 1-1/2" bolt
1	1/4"-20 x 1-1/2" flat-head machine screw
2	1/4" x 1-1/2" fender washers
2	1/4"-20 T-nuts

Tool Holder

1	1/2" x 1/8" x 24" flat bar stock
1	5/16" washer
2	8-32 x 1/2" flat-head machine screws
1	#6 x 3/4" flat-head sheet metal screw
1	5/16"-18 machine bolt, 2" L

Base

1	1/4"-20 threaded rod, 12" L
2	1/4" x 1-1/2" fender washers
2	1/4"-20 nuts
3	1/4"-20 coupling nuts

Qty. Part

1	1/4"-20 stop nut
1	1/4"-20 x 1-3/4" L round-head machine screw
2	#12 x 2" flat-head sheet metal screws
2	1/2" OD x 1/4" ID x 3/4" -long nylon spacers

Catalog Order

4	1/2" dia. rare earth magnets
4	1/2" cups for magnets
10	Washers for magnets
14	#4 x 1/2" flat-head screws for cups and washers
1	Lee Valley T-slot extrusion, 24" L
1	5/16"-18 five-star knob
2	High-quality brass hinges, 2" L, with screws
1	Self-centering bit for #5 and #6 screws

Other Materials

Sandpaper
Clear lacquer
30-minute epoxy
1/8" twist bit for drilling holes in metal

Sources See page I 10

Cutting List

Part	Name	Qty.	Material	Rough Blank	T x W x L	Comments
DISKS						
A1	Driver Disk	1	3/4" MDF	2 pcs. 5-1/2 x 5-1/2	1-1/2 x 5 dia.	Glue rough blanks together, then cut to 5" square
A2	Abrasive Disk	8	3/4" MDF		3/4 x 5 dia.	Make from five squares. Three squares are extra, to check machine setups
A3	Stops	12	Hardwood	3/16 x 3/8 x 10	3/16 x 3/8 x 1/2	
A4	Shaft	1	1/2" dia. bolt, 4-1/2" L		2-3/4" L	Cut off head and threads
TOOL REST						
B1	Guides	2	3/4" MDF	1 pc. 3 x 10	3/4 x 1-1/4 x 4	Cut 45-degree bevel on one side, then rip and cut to final length
B2	Bevel-squaring table	1	3/4" MDF	1 pc. 4-1/4 x 16	3/4 x 4 x 7	Rip to 3-3/4" wide after gluing on guides (B1)
B3	Bevel-angle table	1	3/4" MDF		3/4 x 4 x 8	Rough blank makes B2 and B3
BASE						
C1	Fixed support	1	3/4" MDF	2 pcs. 4-1/2 x 12	1-1/2 x 4 x 4-13/16	Glue rough blanks together
C2	Moveable support	1	3/4" MDF		1-1/2 x 4 x 3-1/4	Cut from glued up C1 rough blank
C3	Base	1	3/4" MDF		3/4 x 8 x 10	
C4	Crank	1	3/4" MDF		1-1/2 x 2-3/8 dia.	Cut from glued up C1 rough blank, make 2-3/8" square
C5	Pointer	1	1/8" hardwood		1/8 x 1/4 x 4-1/2	
C6	Screw	1	1/4" threaded rod		7-1/4" L	Sticks out 6-1/4" from crank
TOOL HOLDER						
D1	Handle	1	3/4" hardwood	2 pcs. 2 x 12	1-1/2 x 1-1/2 x 1-3/4	Glue blanks together, rip to 1-1/2" wide
D2	Clamping block	1	3/4" hardwood	1 pc. 3/4 x 2 x 12	3/4 x 3/8 x 1-3/8	
D3	Machine bolt	1	5/16-18 x 2"		2" L	Cut off head
D4	Bar	1	1/8" x 1/2" mild steel		5" L	
D5	T-slot extrusion	1			6" L	
LAPPING PLATES						
E1		5	3/4" MDF	10 pcs. 5 x 12	1-1/2 x 4-1/2 x 11	Glue two rough blanks together, then trim to size

AW



Display Cabinet

by Randy Johnson

Lots of glass and built-in lights showcase your treasures.

Some cabinets are all about displaying the beauty of wood. This cabinet, with its glass doors, shelves and sides and built-in lighting, is all about displaying what's inside. Whether it's your collection of antique tools or fine porcelain, whatever you put inside is sure to shine.

Box Frames Make it Strong

The upper and lower box frames are the secret behind this cabinet's strength and rigidity (Fig. A, page 81). They join the two cabinet sides together and create a cabinet that is surprisingly strong and rigid. These are important attributes when building a tall cabinet with large glass doors because any flexing in the cabinet can cause the doors to go out of alignment.

Tools and Materials

The power tools you need to build this display cabinet include a tablesaw, jointer, planer, band-

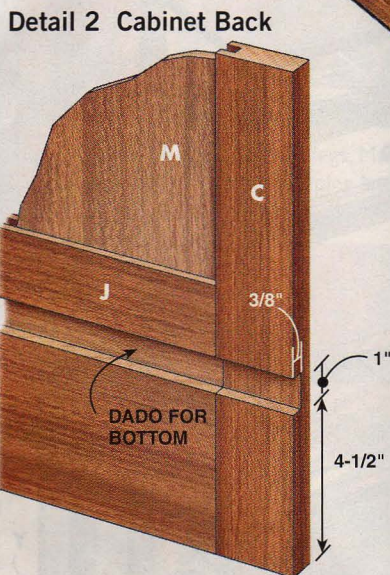
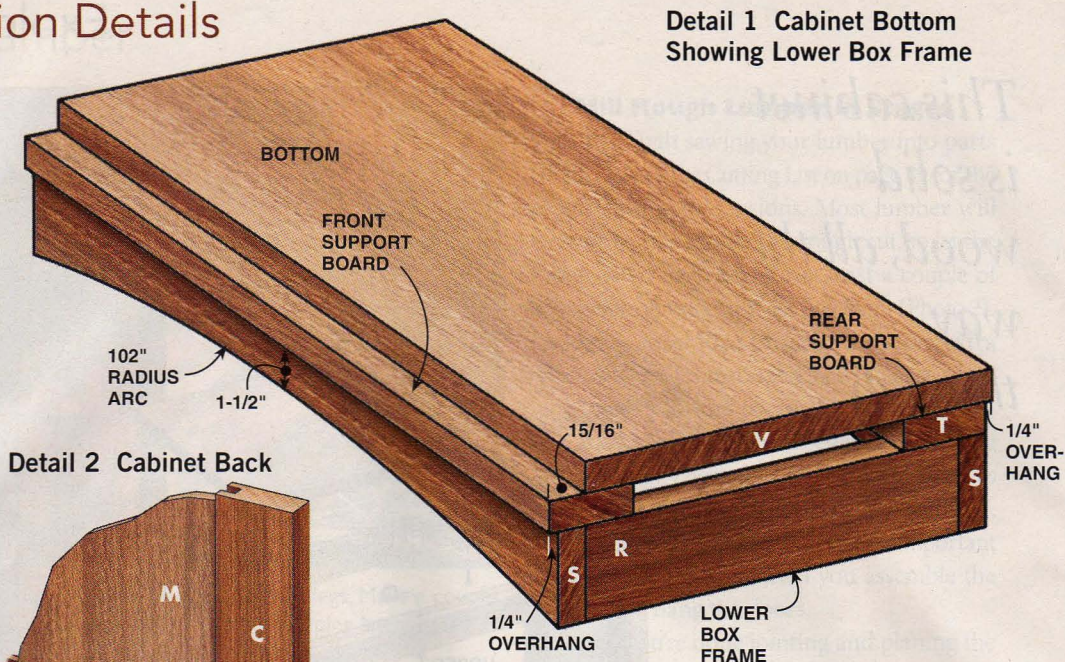
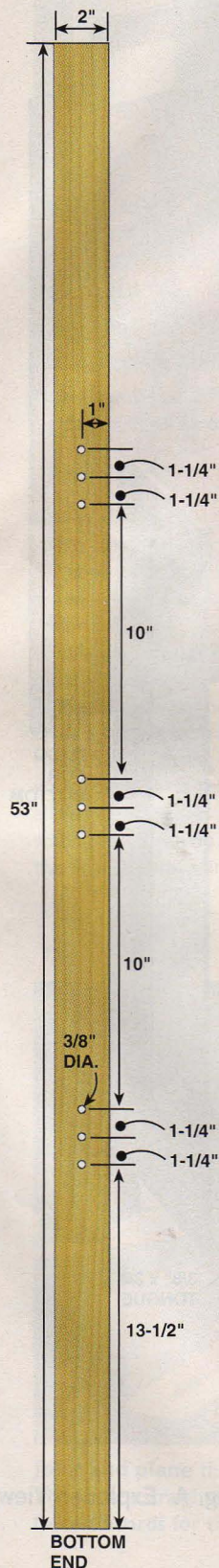
saw (or jigsaw), and a router table and router. A mortising machine is helpful but you can also use a drill and chisel to make the mortises. Other necessary tools include an electric drill, a plate joiner, a dado blade and a variety of router and drill bits.

Plan on using about 80 bd. ft. of 5/4 (1-1/4-in. thick) lumber for this project. If you use mahogany, the lumber will cost you about \$400. Other hardwoods like rift-sawn oak, walnut, or ash would also work. Wood with straight grain works the best. Wavy-grained woods are more likely to bow or twist after construction which could cause problems with the tall doors and panels.

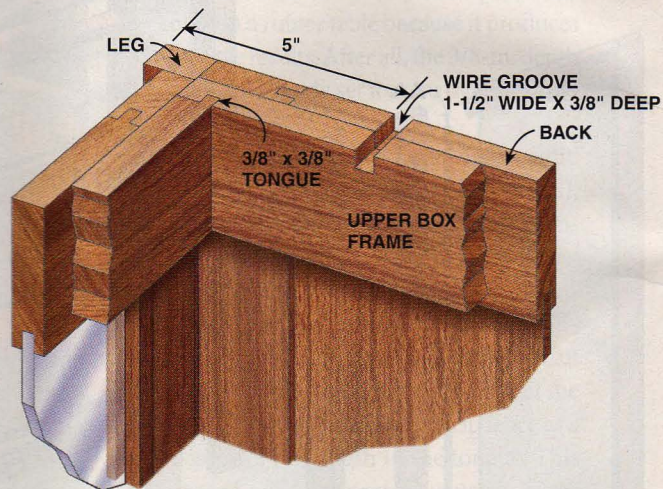
The glass and lighting add another \$400 to the cost (see Sources, page 110). That adds up to a big chunk of time and money, but this cabinet is built to last and will be proudly passed on to your children's children.

Construction Details

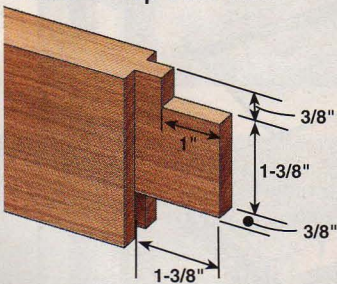
Fig. B Drilling Template for Shelf Pin Holes



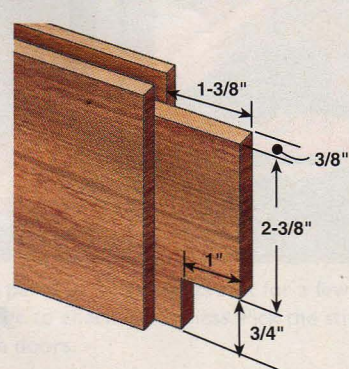
Detail 3 Upper Box Frame



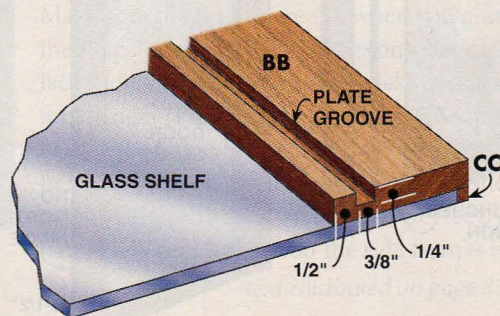
Detail 4 Top Door Rail

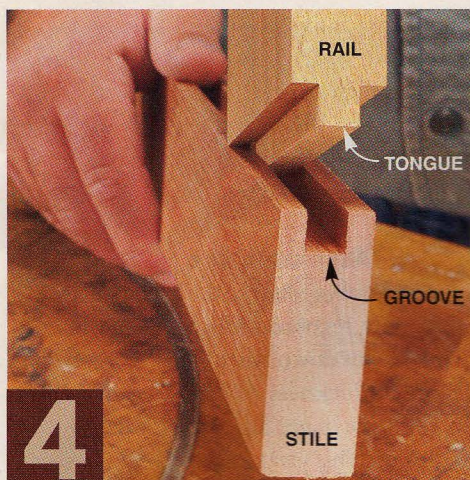


Detail 5 Bottom Door Rail



Detail 6 Optional Plate Rail





Use a tongue-and-groove joint for the side and back frames. The groove is quick to make on your router table, and the tongue can be cut with a dado head on your tablesaw.

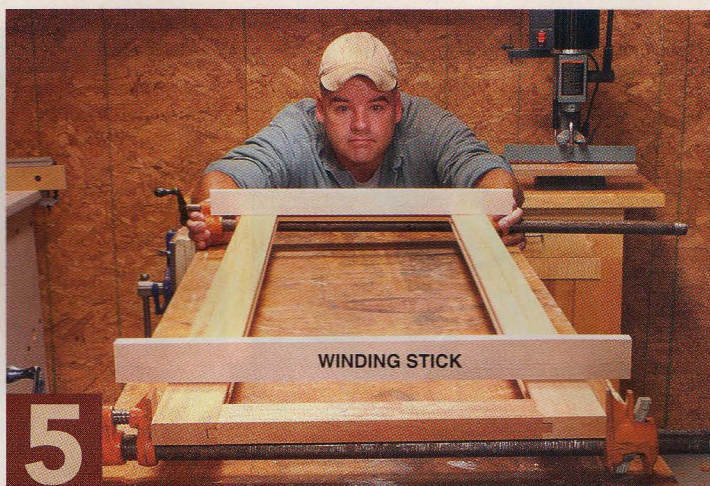
continued from page 80

dry, add the tapered legs (Parts A, Photo 6). Now sand the inside edge of the legs flush with the side frames and rout a 3/8-in.-wide by 5/8-in.-deep rabbet (see Sources, page 110) for the glass on the inside of those frames as well (Photo 7).

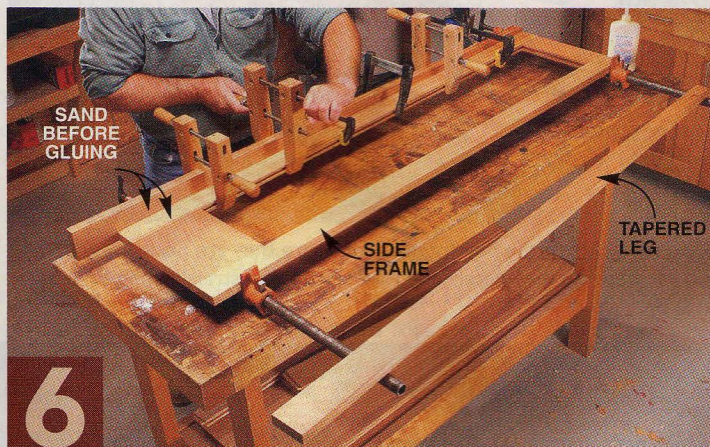
Make the Box Frames

Start making the box frames by machining the tongue-and-groove joints on parts N, P, R and S (Photo 8). A dado blade works well for making this joint. Next cut the arc on the front rail (U) for the lower box frame and glue and clamp the frames together (Photo 9). When the upper box frame is dry, glue the 1-in. side of the top frame rail (Q) to the front (Fig. A).

Dry clamp the completed box frames to the cabinet sides. Set the lower box frame flush with the bottom of the bottom side rails (Photo 10) and the upper box frame flush with the top of the top side rails (F, Fig. A). The front arched rail (S) should be set back 1/4 in. from the front of the legs, but the top frame rail (Q) is set flush with the front of the legs (Photo 10). You may need to make a few small adjustments to the clamps or the position of the parts to get it square, but if your box frames and side panels were accurately made, the cabinet should just about square itself. When



Assemble the side panels on a flat bench. Check for twist by sighting down a pair of winding sticks, which are simply a matching pair of straight boards. Adjust the frame in the clamps until the sticks are parallel.

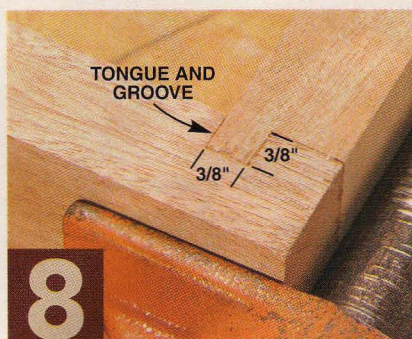


Glue the tapered legs to the assembled side frames. The legs should be flush with the inside of the side frames. Sand the panel side of the legs and the outside of the side frames before gluing these parts together. If you get any glue squeeze out at these inside corners make sure to clean it up with a damp rag before it dries.



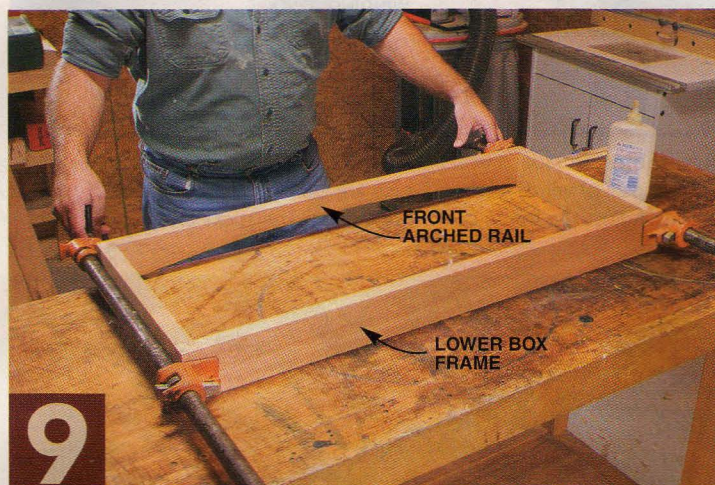
Rout a rabbet around the inside of the side panels for the glass. The router leaves rounded corners, so cut them square with a chisel.

Assemble the Case



8

The tongue-and-groove joints at the corners of the box frames provide positive alignment for clamping.



9

Glue and clamp the box frames. Make sure they are perfectly square and flat, because they determine how square and straight the cabinet ends up.

everything looks good and square, take it apart. Take some time to sand the inside corner areas between the box frames and cabinet sides and legs. It's easier to do this now, before final gluing. Finally, reclamp and glue the sides to the box frames (Photo 10).

Assemble the Back

Glue up lumber to make the back panels (M). We simply resawed a couple of 5/4 boards, planed them down and glued them together. The final thickness of the panels is 3/8 in., but leave the material about 1/64-in. to 1/32-in. thicker. This gives you a little extra material to sand after the panel parts are glued together. Sand these panels *before* installing them into the back frame.

Glue up the back in stages. Start with the center stile (D) and the top and bottom rails (H and J). Make sure these parts are square to each other. Then slide the panels (M) into place and add the side stiles (C, Photo 11). Check that the back is square and let the glue dry thoroughly.

Next, rout the groove for the cabinet bottom (V) in the back (Detail 2, page 82). Fasten

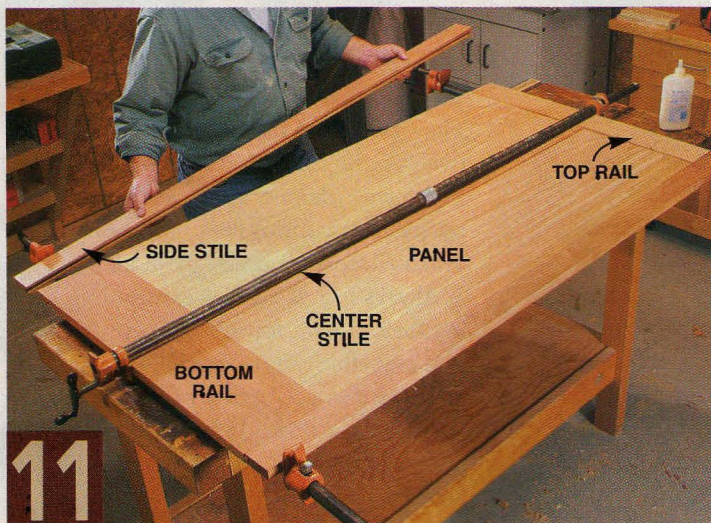


10

Practice clamping the box frames to the side frames. The box frames add an amazing amount of strength and rigidity to the cabinet. Once you're sure the parts fit square and true, add glue and leave everything clamped until completely dry.

Box frames make this cabinet strong and rigid.

Assemble the Back



11 Assemble the frame-and-panel back. First clamp the center stile and top and bottom rails. Then add the panels and the side stiles. Take a dry run at this assembly before actually gluing it.



12 Screw the back to the top and bottom box frames. Add a mending plate along the side to hold the back to the side leg.

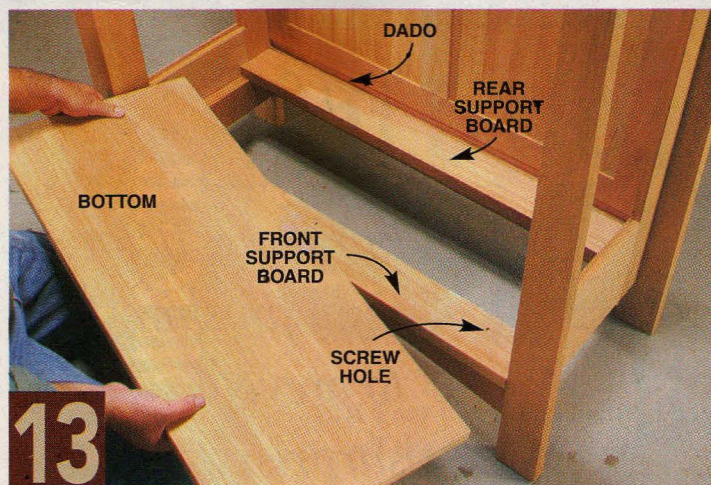
the back to the rest of the cabinet with screws at the top and bottom. Also use a 2-in.-long mending plate (see Sources, page 110) at each side to keep the back and sides flush (Photo 12).

Add the Bottom and Top

Before installing the bottom (V), glue the support boards (T) to the top of the lower box frame (Detail 1, page 82). The bottom is then slid in on top of these support boards. It is held in place with three 1-5/8-in. screws through the

front support board and in a dado at the back (Photo 13). The bottom extends 1/4-in. into the dado. Because the dado is 3/8-in. deep, the solid wood bottom is free to shrink and expand without pushing the back or creating a gap.

The top (U) is held in place with tabletop fasteners (Photo 15, see Sources, page 110). They allow seasonal movement of the solid top. Notice that we have pre-routed the grooves for the light-fixture wires.



13 Slide the bottom in place. The bottom is screwed at the front through the front support board and held at the rear by a dado in the back panel. The dado is 1/8-in.-extra deep to allow the bottom to freely shrink and expand.



14 Drill the holes for shelf pins. Using a shop-made template and a self-centering drill bit makes this simple and accurate. Align the template with the inside edge of the side stiles.

Install the Lights



15 Attach the solid-wood top with tabletop fasteners. This allows the top to expand and contract without cracking. The slots can easily be cut with a plate joiner. Note that wiring grooves have already been routed in the top of the box frame and back.



16 Install the low-voltage lights. This style of light is typically made up of a bezel, a bulb and reflector, and the lens. The transformer and switch are then attached to the back of the cabinet.

Install the Lights

Low-voltage halogen accent lights are a good choice for this cabinet (see Sources, page 110). They are easy to install (Photo 16) and relatively inexpensive; \$60 for the three lights, transformer, dimmer switch and power block. Simple plastic spring clips (see Sources, page 110) hold the wires against the inside of the top.

Always install hardware, including lighting, before final finishing. That way you're sure everything fits correctly.

Now is also a good time to drill the holes for the shelf pins (Photo 14) using a drilling template (Fig. B) and a self-centering bit (see Sources, page 110).

Building and Installing the Doors

Wood-frame doors with glass need strong joinery to handle the extra weight of the glass. That's why I chose a traditional haunched mortise-and-tenon joint (Photos 17 and 18, Details 4 and 5, page 82). Use winding sticks when gluing and clamping these doors, just like you did with the side panels (Photo 5).

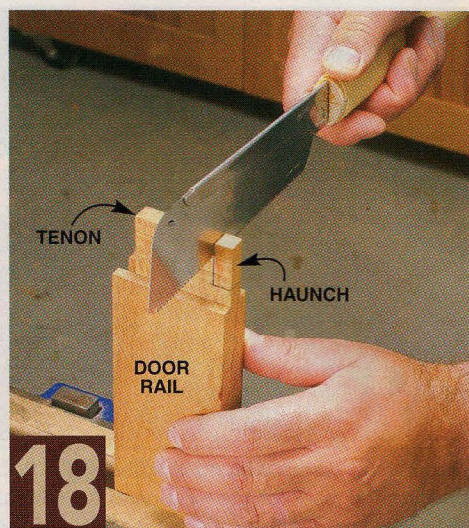
Mount the doors into the cabinet using no-mortise hinges (Fig. A, Photo 19, see Sources, page 110). These hinges greatly simplify door installation. If you've closely followed the sizes in the Cutting List, your doors should fit snug

Test fit all of your parts and hardware before final finishing to prevent surprises.

Build the Doors



Drill mortises in the door stiles. Center the mortise bit right in the middle of the groove.



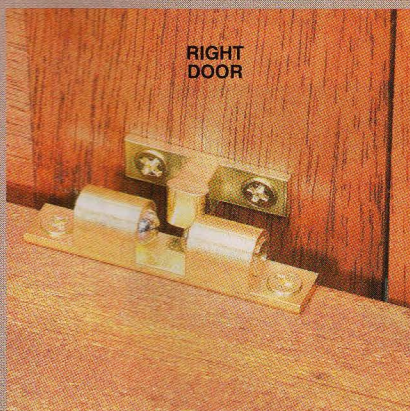
Saw the haunch on the door rail tenons. The haunch will fit into the groove in the door stile and stiffens the mortise-and-tenon joint.

at the top and bottom. This is intentional; the snug fit allows you to trim the top and bottom of each door to produce nice, even gaps (Photo 20). The gap at the top and bottom should match the gap on the sides. With the no-mortise hinges, that gap is a little over 1/16 in. Complete the door installation by gluing the astragal strip (W, see

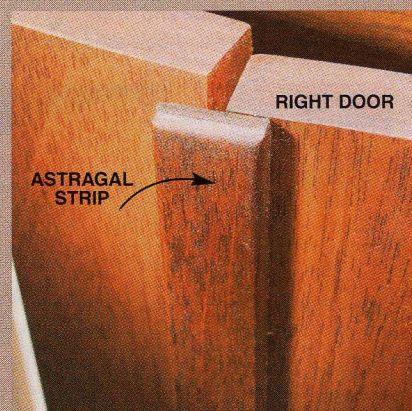
photo, lower right) on the right-hand door. Next add the brass ball door catches (see photo, below left) and door pulls (see Sources, page 110). Cut the glass retainer strips (X, Y, Z and AA) at this time and if you want to display plates, make the optional plate rails (BB and CC, Detail 6, page 82).

Taking the Twist Out of Tall Doors

When building frame-style doors, it's always important to mill your lumber carefully and assemble the doors so they turn out as flat as possible. But inevitably, some doors twist and don't hang flat after installation. This is especially true of tall doors. Anticipating this, we added a couple of details to our doors to overcome any potential twist. The astragal strip and the strong catches work together to hold both doors securely closed and flat.



Use a strong catch on the right-hand door. This brass ball catch can even hold a moderately twisted door flat and keeps the doors securely closed.

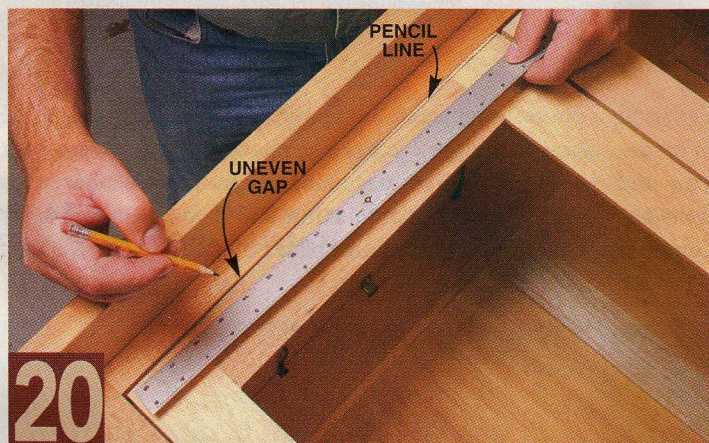


Use an astragal strip to hold the left-hand door shut. It also covers up the center gap between the doors.

Final Assembly



Attach the doors with no-mortise hinges. Put the door in its closed position and mark for the location of the hinges. The doors will likely fit snug at the top and bottom, and that's okay for now. Open the door and install the no-mortise hinges. Because you don't have to fuss with making mortises, their nickname is "the frustration-free hinge."



Check the clearance gap along the top and bottom of the doors. Use a ruler as a guide and draw a pencil line for an even gap. Then remove the doors and belt sand to the pencil line.

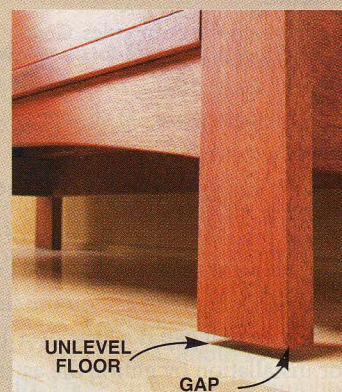


Install the glass and retainer strips after you have stained and finished all of the cabinet parts. Predrill small holes in the retainer strip and then use a brad pusher to install the small brads. The brad pusher is a lot safer than a hammer around glass.

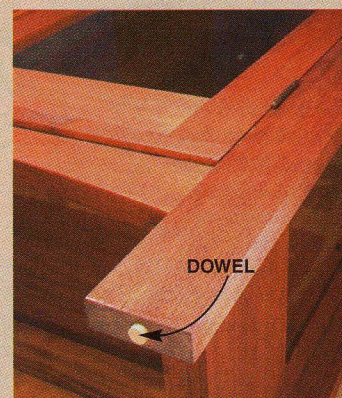
Finishing and Final Assembly

Disassemble your cabinet. Remove the doors, lights, top, bottom and back. Do a final sanding on all the parts and apply the stain and topcoat. We used a red oak stain and wipe-on tung oil finish (see Sources, page 110). When you're done finishing, reassemble the cabinet and install the glass in the doors and sides (Photo 21). Use a brad pusher (see Sources, page 110) for this step—it's safer than a hammer. **AW**

Oops!



One of the legs of our cabinet wasn't touching the floor. Either the floor has a low spot or our cabinet was a little out of square. Not to worry. There's an easy fix, and it works on almost any piece of furniture that has a similar problem. Just drill a hole in the bottom of the leg and add a piece of dowel long enough to keep the cabinet from rocking.



Display Cabinet

Overall Dimensions: 66-1/2" H x 43" W x 19-1/2" D

Part Name	Qty.	Rough Dimensions	Final Dimensions	Notes
LEGS AND STILES				
A Legs	4	5/4" x 3-1/2" x 67"	1" x 3" x 65-1/2"	Tapered one side from 3" at bottom to 1-1/2" at top
B Side stiles	4	5/4" x 3-1/2" x 67"	7/8" x 2-1/2" x 61"	
C Back side stiles	2	5/4" x 3-1/2" x 67"	7/8" x 2-1/2" x 61"	
D Back center stile	1	5/4" x 3-1/2" x 67"	7/8" x 2-1/2" x 50-3/4"	Groove both edges, length includes tongues at both ends
E Door stiles	4	5/4" x 3-1/2" x 67"	7/8" x 2-1/2" x 55-15/16"	
RAILS				
F Side rails- top	2	5/4" x 4" x 12"	7/8" x 3-1/2" x 10-1/4"	Length includes tongues
G Side rails- bot.	2	5/4" x 8" x 12"	7/8" x 7-1/2" x 10-1/4"	Length includes tongues
H Back rail- top	1	5/4" x 4" x 32"	7/8" x 3-1/2" x 30-3/4"	Length includes tongues
J Back rail- bot.	1	5/4" x 8" x 32"	7/8" x 7-1/2" x 30-3/4"	Length includes tongues
K Door rails - top	2	5/4" x 3" x 17"	7/8" x 2-1/2" x 15-1/8"	Length includes tenons
L Door rails - bot.	2	5/4" x 4" x 17"	7/8" x 3-1/2" x 15-1/8"	Length includes tenons
BACK PANELS				
M Back panels	2	5/8" x 16" x 52"	3/8" x 14-3/8" x 50-5/8"	Glued up from narrower boards
BOX FRAMES				
N Upper- sides	2	5/4" x 3-1/2" x 16"	1" x 3" x 13-7/16"	Length includes tongues
P Upper- front, back	2	5/4" x 3-1/2" x 36"	1" x 3" x 35"	
Q Front top rail	1	5/4" x 1-1/2" x 36"	1" x 15/16" x 35"	
R Lower - sides	2	5/4" x 3-1/2" x 16"	1" x 3" x 14-1/8"	Length includes tongues
S Lower - frt., bk.	2	5/4" x 3-1/2" x 36"	1" x 3" x 35"	Front part is arched
T Support boards	2	5/4" x 4" x 36"	1" x 3" x 35"	
TOPS AND BOTTOM				
U Top	1	5/4" x 21" x 45"	1" x 19-1/2" x 43"	Glued up from narrower boards
V Bottom	1	5/4" x 16" x 36"	1" x 14-15/16" x 35"	Glued up from narrower boards
ASTRAGAL STRIP AND GLASS RETAINER STRIPS				
W Astragal strip	1		1/4" x 7/8" x 56"	Trim length to fit final door height
X Glass retainer	4		3/8" x 3/8" x 9-1/2"	Side panel rails
Y Glass retainer	4		3/8" x 3/8" x 50-3/4"	Side panel stiles
Z Glass retainer	4		3/8" x 3/8" x 12-1/4"	Door rails
AA Glass retainer	4		3/8" x 3/8" x 50- 11/16"	Door stiles
PLATE RAILS (OPTIONAL)				
BB Board	3		1/2" x 3" x 34-3/4"	
CC Shelf hook	3		1/4" x 1/4" x 34-3/4"	

Choosing the Right Glass

We used 3/16-in. tempered glass in the doors for strength and safety. Tempered glass is tough and resistant to breakage. When it does break, it shatters into small pieces averaging only about 1/4 in. in size. These small pieces are far less hazardous than the large shards that regular glass breaks into.

For the shelves, we used 1/4-in.-thick regular non-tempered glass with polished edges. Most glass merchants recommend using regular non-tempered glass for shelves. That's because tempered glass is very susceptible to shattering when it gets bumped or nicked on an edge. Regular glass may chip at the edge, but is less likely to shatter suddenly.

The 1/4-in. shelf thickness is fine for holding lighter items, but 3/8 in. or even 1/2 in. would be better if you plan to display heavy objects. Consult your glass supplier for a final recommendation.

Shopping List

Qty.	Part
Glass	
2	Tempered glass for doors 3/16" x 12-15/16" x 50-5/8"
2	Tempered glass for sides 3/16" x 10-3/16" x 50-11/16"
4	Non-tempered glass with polished edges for glass shelves 1/4" x 14" x 34-3/4"
Hardware and Lighting	
12	Shelf pins
6	Hinges
2	Ball catches
8	Tabletop fasteners
3	Accent lights
1	Power block
1	Dimmer touch pad
1	Remote transformer
2	Mending plates
3	Spring clips

Tool Test:

**By Tim Johnson
and Alan Lacer**

Workshop Lathes

**There's one
for every
budget**



ART: JEFFREY VERN JOHNSON • PHOTOGRAPHY: MIKE HABERMANN, UNLESS OTHERWISE INDICATED

Ask anyone who's seen the ribbons of shavings fly—turning wood is compelling. Transforming a spinning hunk of rough wood into an object of beauty has such enormous appeal; everybody wants to try it.

For versatility, nothing beats a general-purpose lathe (Photos 1 and 2). In addition to bowls and plates, a general-purpose lathe can also turn table legs, bedposts and other furniture parts. It can even handle small turnings, like goblets, pens and tiny toy tops.

Spindles (long, slender pieces, such as pens, chair parts and table legs) are turned between the headstock and tailstock centers. Bowls and plates are mounted on a faceplate, which threads onto the headstock spindle.

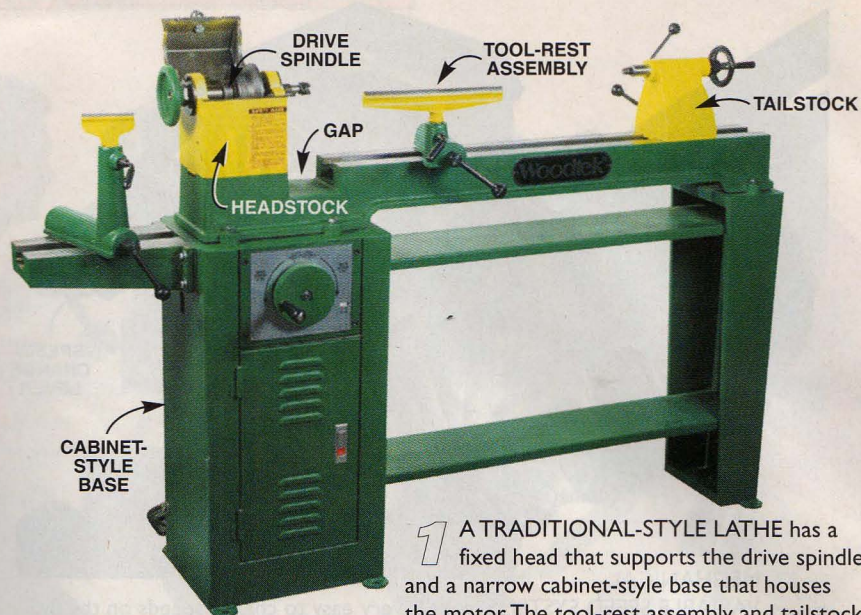
A Lathe Can Be a Big Investment

We tested 18 general-purpose lathes, ranging in price from \$260 to \$1,350. You can pay a lot more (see *You Should Also Know About*, page 97), but the machines we tested should fit the bill for both serious amateur woodworkers and small professional shops, where the lathe isn't used constantly.

All of the lathes we tested have at least 12-in. capacity for bowls and enough spindle capacity to handle a dining table leg.

Most of these machines come supplied with bolt-together leg sets or stands. Machines with cabinet-style bases usually come fully assembled. In a few cases (noted in the chart on page 96), the stand is an additional-cost option.

For testing, we divided the lathes into two price categories: more than \$800 and less than \$800.

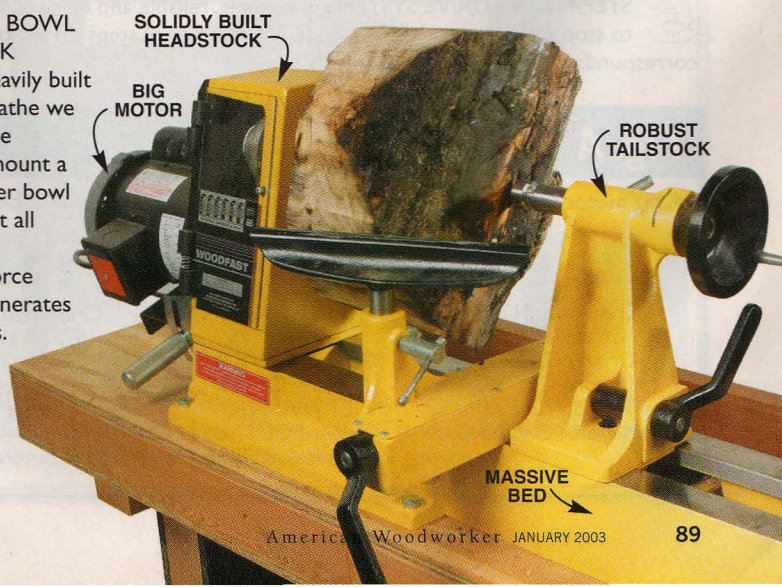


1 A TRADITIONAL-STYLE LATHE has a fixed head that supports the drive spindle and a narrow cabinet-style base that houses the motor. The tool-rest assembly and tailstock slide and lock on the cast-iron bed. The gap allows turning slightly larger diameters of thin stock over the bed. Large-diameter bowls mount on the outboard side of the head.



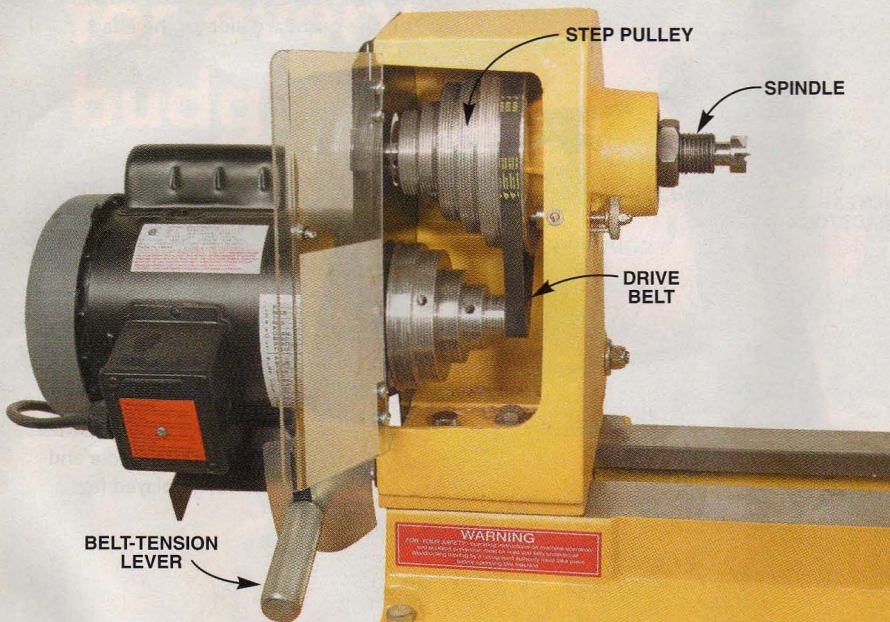
2 THE NEWEST LATHES feature headstocks that slide or pivot, gapless beds, well-located controls, motors mounted near the drive spindle and widely splayed legs.

3 A BIG BOWL BLANK requires a heavily built lathe. Every lathe we tested has the capacity to mount a large-diameter bowl blank, but not all of them can handle the force that blank generates when it spins.





4 MECHANICAL VARIABLE SPEED SYSTEMS make it very easy to change speeds on the fly. Moving the speed-change lever causes the inside diameter of one pulley to expand while the other contracts. The change in diameters changes the spindle speed.



5 STEP-PULLEY DRIVE SYSTEMS are simple, reliable and efficient, but you have to stop the lathe to change speeds. The number of steps on the pulleys corresponds with the number of speeds.

Bowl Turning: The Acid Test

Just about any lathe is adequate for spindle work, small bowls (less than 6-in. diameter), thin plates and platters.

Larger bowls, however, push many of these lathes to their limits (Photo 3). We found that turning 12-in.-diameter rough green-wood bowl blanks was the acid test. Here's why:

- Green wood is heavy, because it's full of water. The lathe must be built heavily enough to withstand the force generated by a massive spinning blank.
- Rough-cut blanks are unbalanced and out of round. A heavy, unbalanced piece can cause destructive vibration on a lathe that lacks stability.
- The blank's edge speed (the rate at which its outer edge travels) increases with its diameter. To maintain a safe edge speed with a 12-in. bowl, the lathe needs to have slow low-end speeds.

Must-Have Features

Green-wood bowl turning has become enormously popular, for several reasons. The wood is free, it cuts like warm butter, and a wide variety of interesting material is just waiting to be found.

For bowl-turning, the bottom line is a lathe's ability to spin a rough-cut, unbalanced blank safely. A capable lathe must turn at very slow speeds and be equipped with a motor that generates sufficient torque. It must have enough mass to dampen significant vibration and the tool rest and tailstock must be rock-solid.

Slow Low-End Speed

Lathes operate over a range of several speeds, to accommodate different size turnings. In general, as the diameter of the blank increases, the appropriate speed decreases.

The key factor is the blank's edge speed. Edge speed increases with diameter; the further the blank's outer edge is from the center, the faster it rotates. At the same spindle speed, the edge of a 12-in.-diameter bowl blank travels *over 20 times faster* than a 1/2-in.-diameter pen blank. For large-diameter bowl turning, slow low-end speed is a must.

Fig. A Motor Size

A big motor is better because it delivers more power for turning at slow speed.

1/2 HP

Craftsman 21712
Grizzly G5979
Grizzly G1067Z
Record CLI-36
Ridgid WLI200
Yorkcraft YC-900WL

3/4 HP

Central Machinery 34706
Delta 46-715
General 160-I-M1
Grizzly G1495
JET JWL-1236
Record CL 3-48
Woodtek 829806

1 HP

Craftsman 21715
JET JWL-1442
Nova 3000
Vega 1446
Woodfast C1000

For pen making, it's just the opposite.

A safe operating speed depends on the size of the blank and the stability of the lathe. For big, out-of-round bowls, slower is definitely better. Many of the lathes we tested don't have the combination of slow speed and stability to safely handle heavy 12-in. greenwood bowl blanks.

Speed Changes

For speed changes, most of the lathes we tested are equipped with mechanical-variable-speed systems (Photo 4). Mechanical systems are user friendly, but they rob a bit of the motor's power and you can *only* change speeds while the lathe is running. This can create a dangerous situation, if you haven't slowed the speed down all the way before mounting a big bowl blank.

We found the slowest low-end speeds on step-pulley-equipped lathes (Photo 5). With this manual speed-change system, you have to stop the machine and move the belt. Repositioning the belt can be difficult if there's not enough room for your fingers.

Power

The motor has to develop sufficient torque to keep the bowl rotating while you cut. For power at slow speed, a bigger motor is better. Small motors just don't generate enough torque.

Lathes equipped with 1-hp motors were the most capable (Fig. A). Three-quarter-hp motors were adequate, but more likely to bog down with a heavy cut. You may have to tailor your cutting rate to the lathe's ability to keep up. One-half-hp motors lack sufficient power. They're okay for spindles, but they stop too easily or spin too fast for big bowl blanks.



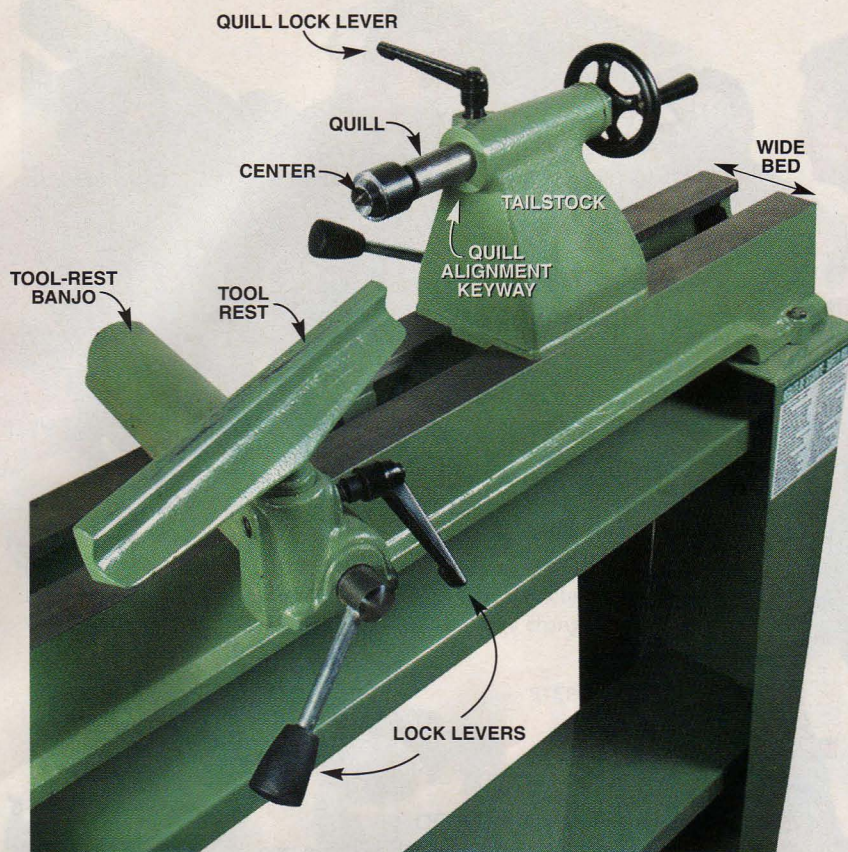
6 WEIGHT IS GOOD.

Robust, cast-iron machines have two important attributes for turning. They're heavy and they absorb vibration. The Jet 1442's cast-iron legs are the best of this category. They provide a wide stance and a low center of gravity. They also include flanges for a shelf, so you can add even more weight.

Stabilize a lightweight lathe



7 IMPROVE ANY LIGHTWEIGHT LATHE for bowl turning by adding ballast. Add a shelf and load it with bags of sand sealed in plastic. Ballast absorbs vibration and lowers the lathe's center of gravity.



8 A TOOL-REST ASSEMBLY AND TAILSTOCK that adjust easily, and lock positively are essential. Substantial castings and a wide bed provide rock-solid support. Look for a long tool-rest banjo, a massive tool rest, long lock levers that are adequately spaced to prevent pinch points, and a tailstock quill with separate accommodations for alignment and locking.



9 A CONTINUOUS BED allows you to position the tool rest behind a bowl blank, as well as in front of it, so you can work both surfaces without remounting the bowl. Delicate, thin-walled bowls are possible, because the inner and outer surfaces will be perfectly concentric. A gap in the bed (inset) limits the tool rest's location.

Stability

For stability, a lathe needs mass, a wide footprint and a low center of gravity. Look for heavy cast-iron components (Photo 6) and a base with provisions for a low shelf, so you can add ballast.

Cabinet-style bases (Photo 1) have a narrow footprint that makes the lathe tippy for bowl turning. Bolt-on legs (Photo 2) splay for stability, but their lightweight structure amplifies vibration.

Adding ballast to a low shelf improves the stability of any lathe, by absorbing vibration and lowering its center of gravity. Sand, sealed in plastic bags so it won't leak, makes great ballast (Photo 7).

Rock-Solid Tailstock and Tool Rest

Loosening or movement of the tailstock or tool-rest assembly during operation can be hazardous, so these parts must lock positively (Photo 8).

A good tool-rest assembly is essential. It's always at the center of the cutting action and it gets handled more often than any other part of a lathe. Uncomfortable, hard-to-use lock levers are a real nuisance. The tool rest should be heavily made. A long banjo (over 11 in.) extends the tool rest's reach, a must-have for bowl turning.

On most of the lathes we tested, the tool rest and banjo are merely adequate. Secure locking is difficult, because the lock levers are either too short, too thin, or too close together. Unsatisfactory lock levers for the tool rest are most common. Even lathes equipped with decent levers on the banjo employ crummy ones to lock the tool rest.

Many of the smaller lathes came with extension arms that mount in the banjo (photo, lower left, page 94). They're intended to increase the reach of the tool rest for outboard turning, but they aren't very useful. A long banjo is much better.

The tailstock houses and supports the tailstock quill, which holds the lathe's second center. For accuracy, this center should align with the drive

center in the headstock. Most of the lathes we tested didn't align perfectly, but they all came close enough.

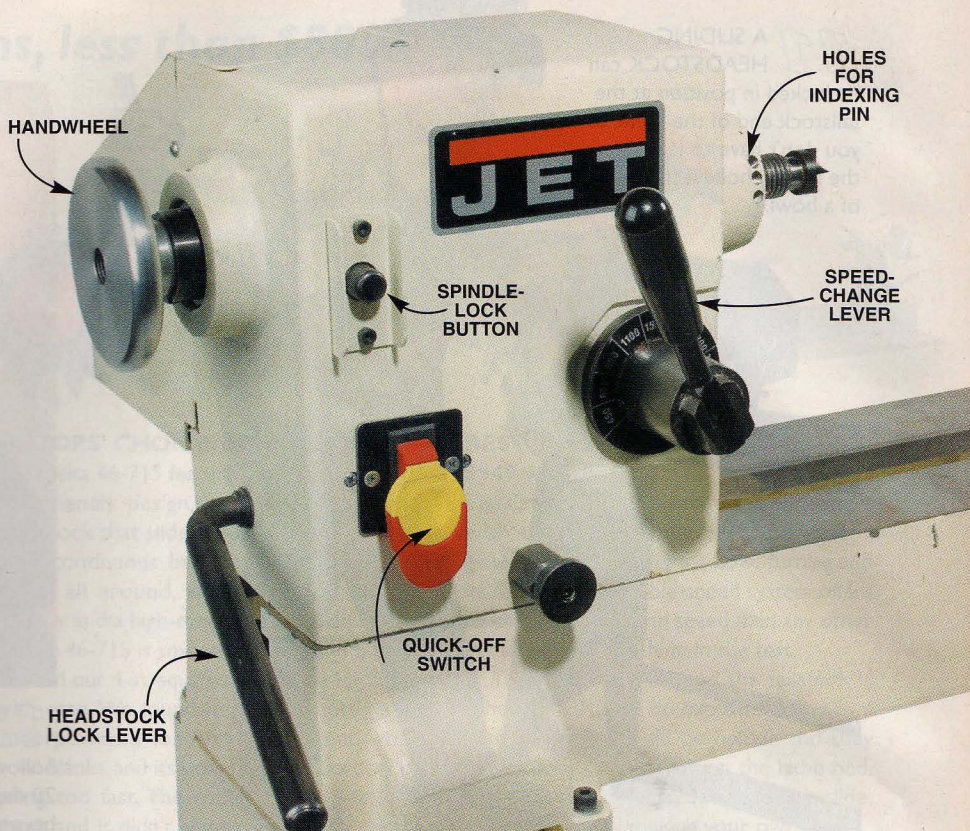
Operating the handwheel extends and retracts the quill, for mounting or removing spindle and bowl blanks. Slide the tailstock close to the workpiece and lock it to the bed. Then extend the quill so the center engages the workpiece and lock it in place. The quill can also be used for drilling operations when used with a specialized chuck.

On most of the lathes in our test, the tailstock quill has a single keyway for locking and alignment. This means the quill can rotate out of position when the lock lever is loosened. If the lock bolt doesn't engage the keyway when it's tightened, the quill can rotate during operation. It's better to keep the tailstock spindle's locking and alignment separate. On some of the more expensive lathes we tested, the spindle's alignment is maintained by a separate keyway or lock ring.

Desirable Features

A Continuous Bed

The gap-bed lathe is an old-fashioned design that allows you to turn slightly larger diameters of thin stock (plates, for example) over the bed. The gap can be a hazard, if the tool-rest banjo slips into the opening while the lathe is running. A continuous bed is better. It allows bowl-turning options not possible with a gap bed (Photo 9).



10 A FULL-FEATURED HEADSTOCK includes a handwheel, a spring-loaded spindle lock, a quick-off switch and an indexed head. Few of the lathes we tested have all four features.

A Full-Featured Headstock

Very few of the lathes we tested have a full-featured headstock (Photo 10). Missing most often is a handwheel, an important feature for convenience and safety. A handwheel makes mounting bowl blanks easier. Instead of trying to hold and spin a heavy, rough-cut blank

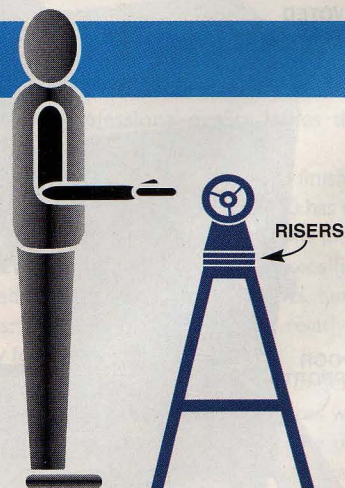
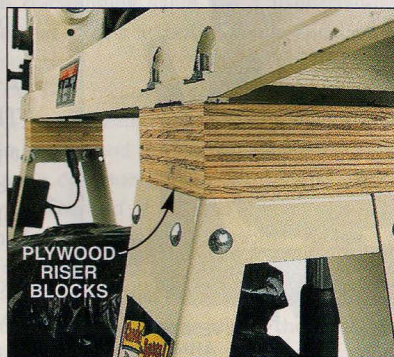
onto the spindle, simply use the handwheel to spin the spindle onto the blank. A handwheel also allows you to inspect work before you start the lathe, to make sure it's solidly mounted and spins without obstruction.

The spindle lock makes it easier to remove faceplate-mounted work. A

Turn at a Comfortable Height

As a group, the lathes we tested are too low. Your lathe's spindle center should be about 1-in. higher than your fingers, when you stand with your arms bent at your elbows and outstretched. This height is likely to measure between 40 and 50 in.; most of the lathes we tested hover around 42 in.

To raise your lathe, stack plywood riser blocks between the base and the lathe bed. Compensate for the higher center of gravity by adding ballast to the low shelf (Photo 7).



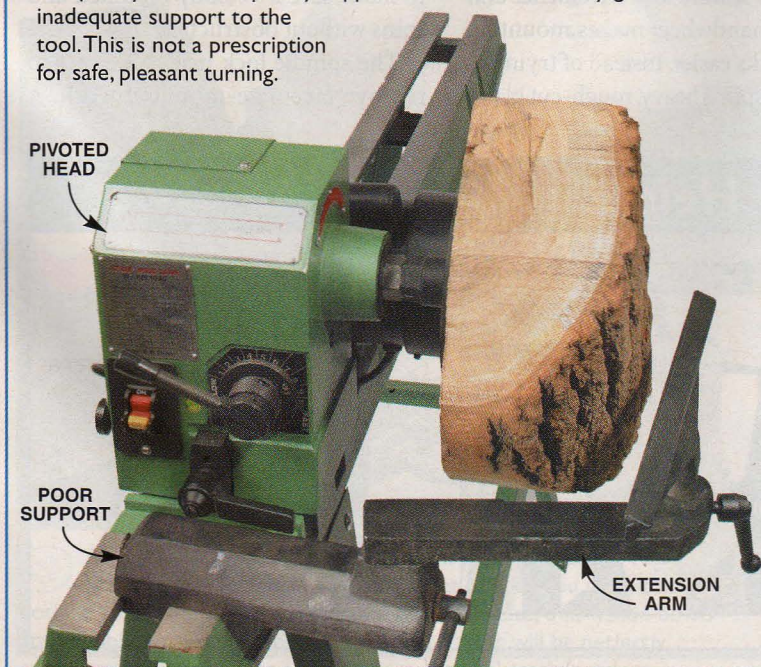
11 A SLIDING HEADSTOCK can be locked in position at the tailstock end of the lathe, so you don't have to lean over the bed to hollow the inside of a bowl.



12 A PIVOTING HEADSTOCK rotates away from the bed to make hollowing easier. However, rotating more than 20 degrees puts the edge of a large bowl beyond the reach of the tool rest.

Don't Try This at Home!

Pivoting-head lathes tempt you to turn large work. After all, it is physically possible to attach large pieces this way. But *don't try it*, especially with a lightweight machine that lacks slow low-end speed. The blank cantilevers too far from the lathe's center of gravity, so vibration is maximized. The completely-extended, poorly supported tool-rest assembly gives inadequate support to the tool. This is not a prescription for safe, pleasant turning.



spring-loaded auto-release mechanism keeps you from starting the lathe with the lock engaged.

Look for a well-located paddle-style switch that you can slam off in an emergency.

An indexed head allows you to hold the workpiece at evenly spaced increments, for decorative work.

A Sliding Headstock

A sliding headstock turns a standard lathe into a short-bed bowl lathe (Photo 11). It eliminates the bed as an obstacle (an important improvement, especially for left-handed bowl turners) but still allows use of the tailstock and tool rest.

A Pivoting Headstock

The Dr. Jekyll and Mr. Hyde of lathe features, a pivoting headstock is either helpful or dangerous. Used correctly, a pivoting headstock allows better access for hollowing (Photo 12).

Every lathe that has one touts its pivoting headstock as a way to turn really big blanks outboard. We don't recommend it. Most of the lathes we tested aren't built heavily enough for this setup (photo, left).

Recommendations, less than \$800

For less than \$800, you can get a lathe that can handle any spindle work and most bowls. You'll have to make some concessions, though, because machines in this category don't have it all.

Two newly introduced lathes set the standards. They have different strengths. The Delta 46-715 is loaded with great user-friendly features, but its motor is a bit lacking for the largest bowls. The Craftsman 21715 has a powerful motor and great slow-speed capability, but its bed, tool rest and tailstock are rather lightly built.

If you only need to use a lathe for occasional light work, there are acceptable machines for around \$300 (see page 97).



EDITORS' CHOICE: Delta 46-715; \$750.

The Delta 46-715 features heavy castings and user-friendly design. It has a fully featured headstock that slides and pivots and it has a wide continuous bed. There are great lock levers all around, widely-splayed legs for stability and a high-mounted quick-off switch.

The 46-715 is smooth running and quiet. It handled our 4-in.-square maple table-leg blanks with ease. We found its 3/4-hp motor a bit underpowered for our heavy green-wood bowl blanks, and its slowest speed borders on being too fast. The tool-rest banjo is a bit short and it didn't always slide easily on the lathe bed.



BEST BUY: Craftsman 21715; \$459, \$549 with stand.

The Craftsman 21715 impressed our testers with its performance. Its 1-hp motor generates good power for bowl-turning and its mechanical-variable-speed system offers much slower low-end speed than any other variable-speed machine in the test.

The bed is narrow and the tailstock is lightly-built. There's no handwheel. The tool rest and banjo could be heavier and they didn't always slide easily on the lathe bed. The headstock pivots, but it doesn't slide. We recommend making your own stand.

Recommendations, from \$800 to \$1,350

These lathes are more heavily built than the less-expensive machines, and usually have more powerful motors, slower low-end speeds and better-quality faceplates, drive centers and live centers. Most of these lathes can handle both spindles and large-diameter green-wood bowls.

Both of our award winners are outstanding values. The Jet JWL-1442 outperformed the other machines in this category in spite of its relatively low price. The Woodfast C1000 has the capacity, castings and tolerances of a professional-quality lathe.



EDITOR'S CHOICE: Jet JWL-1442; \$900.

A winner, from its fully featured sliding, pivoting headstock to its cast-iron feet, the JWL-1442 is an outstanding value. It's a user-friendly lathe that excels at both spindle and bowl-turning.

The 1-hp motor is capable and the lock levers for the headstock, tailstock and tool-rest banjo are big and positive. The cast-iron legs and wide, continuous bed provide unparalleled stability. The end of the bed is machined and tapped to accept bed extensions.

For the biggest bowl blanks, the 1442's low-end speed could be slower. The lock lever for the tool rest is too small and the faceplate could be better.



EDITOR'S CHOICE: Woodfast C1000; \$1,300.

The Woodfast C1000 stands out because it's built like professional-quality lathes that cost nearly twice as much.

The castings are heavy, cleanly finished and beautifully machined. The C1000 has the largest bowl capacity in the test (18 in.), a wide, continuous bed, and an excellent speed range. The headstock pivots, but it doesn't slide. Speed changes are relatively easy for a step-pulley machine.

The 1-hp motor slows a bit under a heavy cut at slow speed and interferes with the drive center's knock-out bar. The tool rest and tailstock quill locking levers aren't at all user-friendly. No stand is available.

Several lathes in this category can handle large-diameter bowls

Lathes less than \$800

Lathes from \$800 to \$1,350

Make/ Model/ Consumer phone	Street Price	Swing and Spindle Length	Observed Speed Range	Variable Speed/ Step Pulleys	Motor	Weight (in lb.)	Splayed Stand w/ Low Shelf Brackets	Wide Bed*/ Long Tool- Rest Banjo**	Tool-Rest Banjo/ Tool-Rest Lockability	Continuous Cast-Iron Bed
Yorkcraft YC-900WL (800) 235-2100	\$260	12" / 33-1/2"	665-2,890 10 speeds	VS	1/2hp; 6a	176	Yes	No / No	Fair/ Fair	No
Central Machinery 34706 (800) 423-2567	\$270	12" / 33-1/2"	600-2,710 10 speeds	VS	3/4hp; 6a	177	Yes	No / No	Fair/ Fair	No
Grizzly G5979 (800) 523-4777	\$295	12" / 33-1/2"	530-2,420 10 speeds	VS	1/2hp; 5a	180	Yes	No / No	Fair/ Fair	No
Ridgid WL1200 (800) 474-3443	\$299	12" / 36"	900-3,470 4 speeds	SP	1/2hp; 7.5a	149	No	No / No	Fair/ Fair	No
Craftsman 21712 (800) 377-7414	\$300	12" / 35" 15" outboard	370-1,950 inboard; 185-976 outboard	VS	1/2hp; 7.8a	160	No	No / No	Sub-par/ Sub-par	No
Grizzly G1067Z (800) 523-4777	\$449	14" / 40"	655-2,777 6 speeds	VS	1/2hp; 8a	179	Yes	Yes / No	Fair/ Fair	Yes
Craftsman 21715 (800) 377-7414	\$449 w/o stand; \$549 w/ stand; \$849 w/ stand	15" / 37-1/2"	320-1,920 variable	VS	1hp; 12a	175	Yes	No / No	Good/ Good	Yes
Record CL1-36 (800) 933-1562	\$599 w/o stand; \$849 w/ stand	12" / 36"	600-2,500 3 speeds	SP	1/2hp; 5.4a	160 w/o stand	Yes	No / Yes	Good/ Good	No
JET JWL-1236 (800) 274-6848	\$600	12" / 33-1/2"	590-2,830 6 speeds	VS	3/4hp; 8a	183	Yes	Yes / No	Good/ Fair	No
Grizzly G1495 (800) 523-4777	\$695	14" / 39"	465-3,120 7 speeds	VS	3/4hp; 12a	248	No	Yes / No	Fair/ Fair	No
Delta 46-715 (800) 438-2486	\$700	14" / 40"	515-2,390 13 speeds	VS	3/4hp; 9.8a	238	Yes	Yes / No	Excellent/ Excellent	Yes
JET JWL-1442 (800) 274-6848	\$850	14" / 37"	495-3,110 8 speeds	VS	1hp; 9.5a	276	Yes	Yes / Yes	Excellent/ Fair	Yes
Woodtek 829-806 (800) 645-9292	\$1,040	12" / 36-1/2"	365-2,155 variable	VS	3/4hp; 12a	285	No	Yes / No	Excellent/ Fair	No
Nova 3000 (800) 551-8876	\$1,175 w/o stand; \$1,325 w/ stand	16" / 44" (w/ two bed extensions)	255-4,045 8 speeds	SP	1hp; 14a	225 w/ motor and 2 bed extensions	Yes	No / Yes	Fair/ Fair	Yes
Record CL 3-48 (800) 933-1562	\$1,179	12" / 47-1/2"	570-2,460 5 speeds	SP	3/4hp; 9.5a	315	Yes	No / Yes	Good/ Good	No
Vega 1446 (800) 222-8342	\$1,295	14" / 46"	430-2,990 variable	VS	1hp; 12.8a	375	No	Yes / Yes	Sub-par/ Sub-par	Yes
Woodfast C1000 (800) 423-2567	\$1,300 no stand available	18" / 37"	340-3,077 6 speeds	SP	1hp; 13.6a	220	No	Yes / Yes	Excellent/ Sub-par	Yes
General 160-1-M1 (819) 472-1161	\$1,350	12" / 36-1/2"	920-3,430 4 speeds	SP	3/4hp; 8.2a	280	No	Yes / Yes	Excellent/ Good	No



Best Buy Award



Editors' Choice Award

*bed 5" or wider

**banjo 11" or longer

Dedicated Keyway for Tailstock Quill	Full-Featured Headstock~	Sliding / Pivoting Headstock	Comments
No	No	No / Yes	6" faceplate
No	No	No / Yes	6" faceplate
No	No	No / Yes	Slowest speed range of recommended low-cost lathes; 6" faceplate
No	No	No / No	Too fast for bowl turning; hollow tube-style bed, tailstock and tool rest are subpar; awkward tailstock (3/4") spindle; small (MT#1) spindle bore; 6" faceplate
No	No	No / No	Slow low-end speed and decent power; hollow tube-style bed, tailstock and tool rest are subpar; small (MT#1) spindle bore; awkward tailstock quill adjustment; 4" faceplate; only available through catalog
No	No	Yes / Yes	6" faceplate
No	No	No / Yes	4" faceplate; only available through catalog
Yes	No	Yes / Yes	Dual solid-steel rod bed; excellent stand (\$200 option); small (3/4") spindle; small (MT#1) spindle bore; 4" faceplate
No	No	No / Yes	6" faceplate
No	No	No / No	6" faceplate; comes with outboard sanding accessories
No	Yes	Yes / Yes	Great on/off switch location; 6" faceplate
No	Yes	Yes / Yes	6" faceplate; available bed extensions: 20" (\$250) or full-length (57") with leg (\$600)
No	No	No / No	Solid performer; good speed range; outboard bed and tool-rest base included; 3" and 5" faceplates; poor on/off switch and v.s. lever location; v.s. lever is awkward to use; 12" tool rest is extra-cost accessory
Yes	No	No / Yes	Good power; great speed range; price includes motor and two 21" bed extensions, add'l. extensions (\$150); motor comes w/out switch and power cord; tool-rest lock levers are too close together; large (1-1/4") spindle; exposed tailstock spindle threads are a nuisance; 6" faceplate
Yes	No	Yes / Yes	Good spindle lathe; excellent stand; dual solid-steel rod bed; comes with 9" and 24" tool rests and 2 banjos; awkward tailstock quill adjustment; small (3/4") spindle; small (MT#1) spindle bore; 4" faceplate
Yes	No	No / No	Good power and speed range, but not user friendly; awkward speed adjustment wheel; hard-to-use T-handle lock levers; 6" faceplate
Yes	No	No / Yes	No stand available; large (1-1/4") spindle; 3-1/4" faceplate; on-off switch can be mounted at head- or tailstock
Yes	No	No / No	Good spindle lathe; slowest speed is way too fast for large bowl work; 3" faceplate

~Handwheel, spindle lock, quick-off switch, indexing

Lightweight lathes are perfectly good

If you're not into turning heavy, large-diameter bowls, you don't need a big lathe. If you need a lathe only for occasional use, you don't have to spend a lot of money either.

Lightweight lathes from Central Machinery, Yorkcraft and Grizzly are capable machines that only cost about \$300.

Lightweight lathes are fine for most turning operations, as long as the diameter of the object you want to turn is limited to 4 in. or less for spindles (such as dining table legs) and 6 in. or less for bowls. Miniatures, pen and pencil blanks, goblets, lidded boxes, balusters, bed posts, furniture parts, shallow plates, tops and small bowls are all viable turning projects on a lightweight lathe.



You Should Also Know About

Professional-quality lathes don't compromise on performance or stability. This \$4,800 model weighs 800 lb. and can swing a 20-in. bowl or a 36-in. spindle. Power is supplied by a 3-hp motor and controlled by an AC electronic-drive system. It provides infinitely variable speeds (from 70 rpm to 3,000 rpm, in three different speed ranges), dynamic braking (to stop the lathe quickly when you shut it off) and reverse. **AW**



What's Coming Up

in AW #99, March 2003

Our Annual Router Special



PHOTOS COURTESY OF MANUFACTURER

Oval Picture Frames

For something a little different, Randy Johnson is working on a simple way to make oval picture frames, using a router and a couple slick jigs. These frames make great gifts, and are an interesting way to use up some of the little pieces of good wood you've got kicking around.

Package-Deal Routers

A strong candidate for the router that does everything is a 2-hp unit with interchangeable plunge and fixed bases. George Vondriska is master-minding our test of these great-value tools, with a keen eye on the latest innovations.

Plastic Laminate Tips

Okay, it's not wood, but many woodworkers use plastic laminate, for kitchen and bath countertops, or shop equipment such as a router table. We'll show you how to put it on without any "oops!"

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This is a box cutter with style. It uses most of the utility blades available for standard utility knives. We have illustrated six different blades which will work in this knife including household and contractor grade blades. There may be others.

This neat little knife has a 3-1/2" black aluminum handle with a stainless steel clip to hold it at the top of the pocket, a liner-type lock of stainless steel and a removable utility blade. Includes a blade removal tool and a replacement allen screw for the blade. Weighs 3.0 oz.

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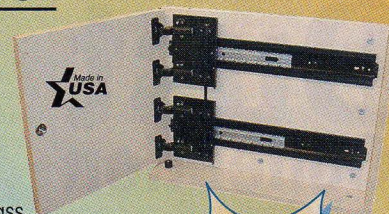


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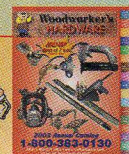
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The AW Router Table

A year ago we tested commercial router tables, and Dave Munkittrick has taken the best features of all of them, plus a few refinements of his own, and rolled them into what we believe will be the "Editors' Choice" of router-table designs. It doesn't look like a piece of furniture, but man, does it perform!



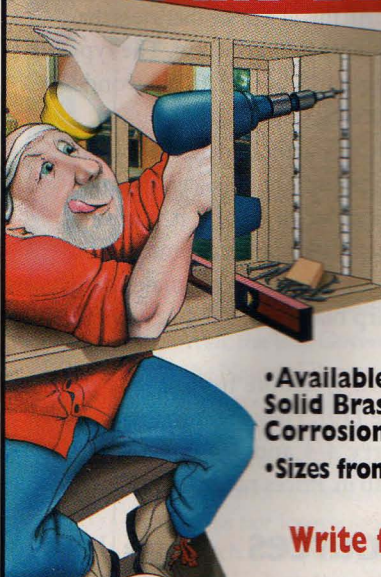
Stickley-Style Blanket Chest

Tom Caspar has just finished this prototype for a classic chest, which will be built of red oak and oak plywood. He'll show you not only how to build the chest, but how to make templates for the little "butterflies" and how to cut them with (what else?!) a router.

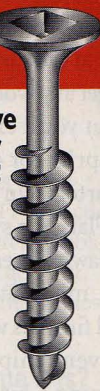
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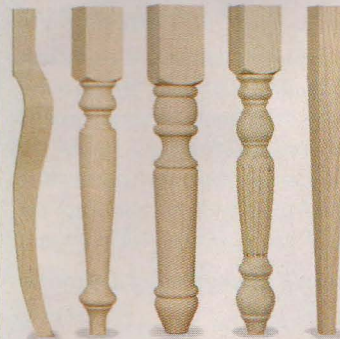
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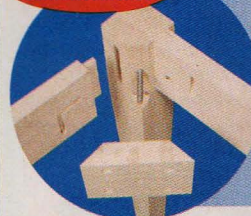


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Great Wood!



HALL TABLE AND PHOTO BY JOHN M. MCGRAW

Quartersawn Sycamore

Sycamore (*Platanus occidentalis*) is North America's tallest hardwood. It is a close-textured wood with interlocking grain that makes it notoriously difficult to split. Because of its toughness and resistance to splitting, sycamore is often used for butcher blocks, flooring and even buttons (thus the nickname "buttonwood").

Perhaps because of its many utilitarian uses, sycamore has not been widely used for furniture. That is, until craftspeople began to discover *quartersawn* sycamore. Quartersawing releases the hidden beauty of the wood. The large, dense clusters of brown rays contrast beautifully with the surrounding whitish wood tissue. The rays seem to bend and distort at the surface, creating a highly decorative figure that's sure to get any woodworker excited. All this at a price that's less than what you'd expect to pay for highly figured wood. The typical price for 4/4 sycamore is about \$5 per bd. ft. No wonder quartersawn sycamore is becoming so popular.

Flatsawn sycamore is hard to dry without defect, but quartersawing greatly reduces this problem. Quartersawn sycamore is a moderately hard wood, similar to cherry. It machines and finishes well, although sharp cutters are recommended to prevent chip-out. The interlocking grain can make hand planing a bit tricky, but a sharp blade and a light cut yields good results.

We bought our quartersawn sycamore from West Penn Hardwoods (see Sources, page 110). They specialize in quartersawn hardwoods and carry 4/4 and 8/4 quartersawn sycamore in widths from 4 to 10 in. Prices range from \$5 to \$6 per bd. ft. **AW**

Sources See page 110

Copious ray fleck undulates at the surface giving quartersawn sycamore the look of some exotic animal hide.

PHOTO BY MIKE HABERMANN

Know of some Great Wood? We'd love to hear about it. Write to us at greatwood@readersdigest.com.

ART DIRECTION: PATRICK HUNTER

Oops!

Edited by **Tim Johnson**

Butcher-Block Rock

A customer left the remains of a huge butcher block on the floor of my workshop. It had split in two and he wanted it repaired. The pieces were too heavy for me to hoist up onto my assembly table, so I decided to reglue them right where they sat, on the concrete floor.

I figured that only polyurethane glue, the kind with the big ape on the label, was strong enough. I cleaned the surfaces, slathered on a liberal amount of glue, clamped the pieces together and called it quits for the night.

Sure enough, the next day the block was one solid piece again. Unfortunately, it had

become one with the floor as well! I pushed and pulled, but the block wouldn't budge. I fired up my truck and tried to knock it loose. Nothing moved, except my bumper.

In desperation, I hammered flat pry bars underneath each side of the block, and finally managed to break it free

from the concrete. The butcher block is fine, except for the bottom, which looks like the surface of the moon. I just hope my client doesn't realize those bits of wood stuck to my floor belong to him.

Jack Dunigan



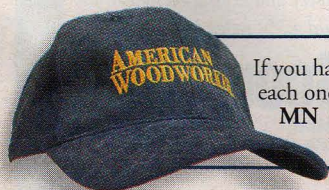
Porcupine Dish Rack

I decided to build a simple dish-drying rack—just dowels mounted in the rails of an open-frame base. I wanted the holes to be straight and square to the base, but I don't have a drill press, so I borrowed one from a fellow woodworker.

My first mistake was that I didn't measure the exact diameter of the dowels ahead of time. All of the holes I drilled turned out to be too small.

My second mistake was that I used my hand-held drill to widen the holes. I thought it would be easy to follow the holes I'd already drilled. Boy, was I wrong. Not one of my dowels went in straight. My simple dish rack looks like a porcupine.

Jason Massignan



If you have a woodworking blunder you're willing to share, send it to us. You'll receive \$100 and an AW cap for each one we print. Send to: **AW Oops!, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121, or e-mail to oops@readersdigest.com.** Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions, and use them in all print and electronic media.

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